

Contributions about ICT and E-learning in Chosen Czech Andragogic Journals – Content Analysis

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Abstract – The aim of the study is to explore the issue of ICT and e-learning in education in selected Czech journals focused on the adult education. Firstly, personal computers and internet penetration in the Czech Republic and development of e-learning and ICT in adult education are described. Field study is based on content analysis of published articles in the period from 2001 to 2017, when 30 papers were found on ICT and e-learning in adult education, which were further analysed. Some of the interesting findings include low occurrence of empirical studies. The results also show a low number of international source citations. Outputs are discussed and compared with previous researches in the Czech Republic.

Keywords – Adult Education, Content Analysis, E-learning, ICT.

1. Introduction

This paper seeks to supplement the Tuma's [1] unfinished answer how much Czech magazines focused on education issues reflect e-learning and information and communication technologies. Since the early researches have analysed journals e-Pedagogium, Orbis Scholae, Pedagogical orientation, Education and Studies Paedagogica, attention was focused on five magazines, four of which are purely andragogic. Those are Adult Education, Andragogic

revue, Adult education in practice and Lifelong Learning, and Media4U, which is primarily focused on the use of media in the educational process, but de facto it is a multidisciplinary journal and includes contributions from economics, didactics, technical sciences and the like. In addition, it is possible to further analyse magazines dealing with specialist didactics (Biology - Chemistry - Geography, Didactic studies Envigogika, Geographical Perspectives, Music, Journal of Information Technology and Education, Art Education), magazines for education (Paidagogos, Special Education), or Aula dealing with higher education. Furthermore, there are other Czech magazines that are not included on the list of peer-reviewed journals RVVI.

The goal of the article is using the technique of content analysis to determine how many papers in selected Czech andragogic magazine were devoted to the use of ICT in education or e-learning. It also explores a more detailed specification of articles by subject, type of study, the methodology used and the origin of the cited sources.

2. ICT and e-learning in adult education in the Czech Republic

Digital technology significantly entered the field of education in the Czech Republic in the first half of the 90s of the 20th century. A prerequisite for utilization of ICT and e-learning is penetration of internet into Czech companies and households. And there is a visible big upswing in the last couple of years. For instance, in 2003 almost 90% of companies were connected to the Internet, but we must admit they have used rather e-mail communication instead of a communication via own websites. The proportion of the Internet connection was lower with smaller companies (88.4%) and higher with larger companies (99.1%). Today, both are almost 100%. Furthermore, 40% of the companies in 2000 had their own web site, today the proportion is 80% [2].

DOI: 10.18421/TEM74-12

<https://dx.doi.org/10.18421/TEM74-12>

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Received: 30 August 2018.

Accepted: 12 October 2018.

Published: 26 November 2018.

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www.temjournal.com

Much increasing is the equipment of personal computers and use of Internet by the Czech households. In the year 1989, only 1.8% of the Czech households were equipped with a personal computer, however in the year 2005 it was 30% and the number rose to 76% in the year 2017, which is over average number in comparison with other 28 EU states [3]. The Internet connection has been monitored since the year 2001, and 5.8% of the households were connected to the Internet. It grew to 19.1% in 2005 and 77.2% in 2017 [3]. These trends are also illustrated in enclosed figure.

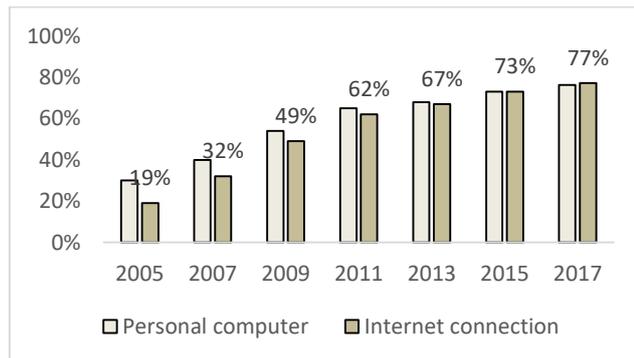


Figure 1. Development of equipment of personal computers and internet connection in Czech households

The year 1999 was the breaking point for the development of e-learning in the Czech Republic. That year the first twenty Czech experts were trained for online courses in the learning management system (LMS) Learning Space. This was a part of a project called Learning about Open Learning (LOLA), held under the auspices of the Herriot Watt University, Edinburgh, United Kingdom. There had already been some partial attempts to implement online forms of e-learning and computer-based training (CBT) form before the year 1999, when a simple software was used as a common practice [2]. Even though in the couple of last year's e-learning and ICT in adult education have its growing of utilization in Czech companies, there is still a lack of research surveys and systematic research findings in e-learning and ICT in adult education.

3. Content analysis and its methodology

Content analysis is a quantitative research method for the systematic and intersubjective verifiable description of communication contents, which proceed from academically substantiated asking questions [4]. It is probably the fastest- developing quantitative research technique, which is amenable to application in sundry contexts, like the analysis of news, advertising, films, novels, political speeches, etc. [5].

Content analysis consists of social science measurement and quantification methods; in using the method, media contents can be explored with respect to the chosen characters. During the analysis, every step must comply with determined rules [4].

At the beginning of the research, there are set research questions and hypotheses. Then, the sample and representative sample construction are defined. In the next step, the smallest measurement unit is set, which could be a word, theme, entire article, news item, etc. The key analysis part consists of the creation of categories per which the content will be analysed. After finishing the coding, the variables have been coded, the research continues with the assessment and deduction of the data gained [6]. The advantages of content analysis include the provision of objective outputs independently of the researcher leading the analysis [7].

The method also facilitates the processing of large amounts of text and the verification of the outputs using statistical analysis. The outputs can be converted to tables and graphs. The strength lies in the significant level of method structuring, which guarantees a high grade of outcome verification [4]. Thus, content analysis is valid, reliable and enables generalization of the findings gained [5].

The weaknesses of content analysis are the contribution of hard data, but the method does not offer any explanation. It is also necessary to mention that even though quantitative data could be considered as set, they are only an output of the researcher's constructed categories. In addition, every categorization involves an average; thereby, the unique differences between each representative are eliminated. Content analysis moreover focuses on quantifiable effects, through which reality is reduced [7]. The possible solution to content analysis's imperfections is to combine this quantitative approach with a qualitative one.

Content analysis involves five basic steps: research design setting, research organization, verification, data collection and data assessment. Research design consists of all the components influencing the chosen method, particularly variable operationalization (the transfer of general concepts to analysed symbols). It is necessary to define the sample from the point of view of media type, content type analysed and period [4].

After that, it is necessary to set an analysis level, thus at is to set, what will be a concept, or general category, which will be searched for [8]. The categories could be words, phrases, themes, semantic units, etc. Then follows the coding, which means giving assigning units to theoretically supported categories [8].

For coding purposes, it is appropriate to prepare a detailed codebook, according to [4].

It is important to distinguish whether the analysis unit will be coded as a frequency or as an assigned importance level (related concept). In larger research projects, a coder's service is used, which also provides greater objectivity than the author's own coding. There are some other rules for coding mentioned by [4].

Nevertheless, every time, it is important to keep a record of the documents explored (for example. x. in prepared form), in which the frequencies of individual categories are written. The document evaluation criteria must meet two conditions: they must be reliable and valid. Reliable data according to [8] consist of records generated by two or more observers or measuring devices and concern the same set of phenomena. In content analysis, two data-making processes are distinguishable: unitizing and coding. In the practice of research, unitizing and coding may occur together, but the mathematical processes used in evaluating their reliability are different, as are their data reliability.

Validity means quality of research results, leading to their acceptance as true, about the real world of people, phenomena, events, experiences and actions. Content analysis is valid if the inferences drawn from the available texts withstand the test of independently available evidence and of new successful actions [8]. The research design gained by preliminary research is verified with a small data sample and after adjustments the full research can commence. The document analysis consists of frequency recording of settled categories using coding symbols. In the data analysis, classical statistical methods like frequency tables, contingency tables, cluster analysis, factor analysis or hypothesis testing are used.

In the phase of preparation and realization of this survey, we tried to find relevant literature sources from Czech as well as foreign literature. Some paper has analysed whole issues of chosen journals in the set period [9, 10], paper with the highest number of citations [11], chosen sections in certain magazine [12] or paper for some certain theme in four chosen magazines [13]. Most of these studies were focused on methodological aspects and themes of papers, partially only some studies were focused on analysis of authorship and numbers of citations. Except for one study [12], these are analysis about the actual development in ICT in education.

In the Czech Republic, this theme was explored by some of earlier studies of [14] about ICT papers in one chosen electronic webpage, and the study by [1] about ICT in education in five of the most important Czech educational journals since 2005 to 2011.

4. Results and discussion

In chapter Results and Discussion will be presented the structure of the sample and the reasons why mentioned magazines were included in the analysis.

A) *Sample*

Based on earlier research, for example [15] and [16], examined representations of papers about ICT in top five Czech pedagogical journals. In the sample were included titles such e-Pedagogium, Orbis Scholae, Education orientation, Pedagogy and Studia Paedagogika. However, no attention was paid to magazines aimed primarily at adult education. There are three (Adult Education, Andragogic revue and Lifelong Learning), which are registered on the Czech list of peer-reviewed journals called RVVI.

Regarding the focus of the article, the sample was extended by another selection of Media4U magazine, which admittedly also includes contributions in the field of adult education, but primarily focuses on the area of ICT education. That is why in this magazine were analysed only the articles dealing with the use of e-learning in adult education. Entries for e-learning and ICT in education at the elementary, middle and high school (for full-time students) in this magazine are well represented but the presented analysis has not been focused on them. Fifth magazine included in the analysis was a relatively new periodical Andragogy in practice, which comes only from 2014 and is situated on a list of peer-reviewed journals by RVVI.

However, it is defined by the type of media monitored and analysed content but the problem is the time frame of the research, as each magazine comes vary greatly and are therefore comparable to each other only in 2014. In our research, however, for clarity all years are studied.

Firstly, the sample was defined as a set of all journals specializing in science education and training, particularly adult education, which is currently based in the Czech Republic. Indicative analysis was performed, and the sample was included in three and two scientific journals, whose topics are from the field of ICT in adult education and e-learning. The sample in Table 1. is characterized.

Table 1. Page layout description

Journal title	Scope of the journal	Available years	Periodicity	Articles in total	Articles from e-learning and ICT area	Share
Andragogika v praxi (Adult Education in Practice)	Professional	2006 – 2017	4 x year	299	16	5,4%
Aula	Academic	2005 – 2017	4 x year	139	7	5,0%
Andragogická revue (Andragogic Revue)	Academic	2009 – 2016	1 x year	71	1	1,4%
Media4U	Academic	2001 – 2017	4 x year	568	6	1,1%
Lifelong Learning	Academic	2011 - 2017	3 x year	92	0	0 %
Total				1169	30	2,6 %

Based on the presented descriptive statistics of number contributions, it is visible that the articles on the theme of e-learning and ICT in education appear quite sporadically, even in the journal Media4U, which has in the title focus on the media. Paradoxically, the highest proportion of articles is in the journal Adult Education and Aula.

The data was analysed by the table processor Microsoft Excel and statistical software SPSS 22.0. Descriptive statistics were used to find relationships between set variables. Those variables were number of articles in each journal per year, a number of articles about e-learning and ICT in each journal per year, author name, article name, type of paper (examples of practise, empirical study or theoretical / overview study), theme of the paper, methodology used, technique, number of literature sources in Czech language, number of literature sources in other languages and the length of the paper.

B) Outcomes analysis

According to [1], articles were divided into three categories, (1) a theoretical overview study, (2) empirical studies and (3) examples of practices. The reason for this division is to use research methods, and compilation of already known facts. Examples of practice do not include empirical data and are not based on a thorough analysis of the existing publications. For more information about the division provides [1].

Table 2. Characteristics of published papers from ICT area (in per cent, n = 30)

Journal title	Examples of practise	Empirical studies	Theoretical / overview studies
Andragogika v praxi (Adult Education in Practice)	36,6	6,6	10
Aula	3,3	16,6	3,3
Andragogická revue (Andragogic Revue)	0	0	3,3
Media4U	10	10	0
Total	50	33,3	16,6

In comparison with the research [1], however, a reverse trend, at least represented are empirical studies, which are among the most common in [1], and conversely the most frequent examples of good practice, which Tůma found only five times. It is obvious that the sample is very asymmetrical to the detriment of empirical studies with a too high proportion of practical examples. Found are the empirical studies dealing with three different topics: students' attitudes to learning, use of e-learning development staff of small and medium enterprises (theme based on the dissertation theses of the author) and the possibilities of using e-learning at technical university.

Table 3. Occurrence of monitored variables published by contributions about ICT (in per cent, n = 30)

Theme	E-learning	73,3	Language of Sources	Czech	80
	Distance education	16,6		English	60
	ICT literacy	10		Other	0
Range	1 page	33,3	Methodology*	Quantitative	40
	2 – 4 pages	30			
	> 4 pages	36,7			

* For item methodology are presented only the options that have occurred in the analysed articles. Other options are not present and therefore are not mentioned in the table.

The affiliation of authors publishing in journals of individual universities cannot be unambiguously determined, it is evident that some authors have more publications. These include Dr. Dana Egerová from the Faculty of Economics University of West Bohemia, which has three posts, including one in

Media4U and two in Adult Education. Two contributions also have ass. prof. Ludvík Eger from the Faculty of Economics University of West Bohemia and Dr. Zuzana Horváthová from the Department of Law and Public Administration of the Metropolitan University Prague (both in Adult Education).

All published articles can be classified into one of three areas: (1) e-learning, (2) distance learning, (3) information and communication literacy, and most occurred posts on e-learning (73,3% of cases), followed by publications about distance education (16,6%) and ICT literacy (10%).

Regarding the distribution of the types of articles where empirical studies are only three, it is logical that the authors used research methodology only rarely. However, four articles can be found where a quantitative approach was used and the technique was in all four cases the questionnaire. The reason why research shows four occurrences when empirical studies were only three is that the research has been used also in one of the examples of the practice.

Data collection tools used for obtaining of respondent's answers were in 33,3% cases a questionnaire (both in hard copy and electronic one) and in two cases (6,6%) an educational experiment. The reason why the questionnaire is so widespread is its price and ease of use.

Table 4. Type of questionnaire, distribution of the sample size, sample selection method, data analysis methods (in per cent, n = 10)

Type of questionnaire	Multiple-choice questions	50	Sample size	0 - 100	20
	Lickert scale	40		100 - 300	30
	Combination of both	10		301+	50
Sample selection method	Purposive	40	Data analysis method	Qualitative	0
	Convenience	30		Quantitative Descriptive	70
	Random	30		Quantitative Inferential	30

One half of the studies which were based on questionnaire used multiple-choice questions, because this is easy for evaluation as well as Licker scales in 40% of the articles. One study used a combination of multiple-choice questions and Lickert scale.

The most frequent were studies of 300 and more respondents and on the other hand only two researches have 100 or less respondents. The minimum sample size is 23 respondents and the

maximum one is 896 respondents. Average size is 315.8 respondents, mode is 315, median is 246 and standard deviation of the sample is 284.65 for $p < 0.05$.

Regarding the sample selection methods, their distribution is quite comparable, because 40% of the sample selection method are purposive and convenience selections, and the rest of 30% are random selections.

70% of studies were analysed by quantitative descriptive methods and 30% by quantitative inferential. Methods used in studies with quantitative descriptive methods were frequency or percentage tables. Methods for quantitative inferential studies were various statistical tests (t-tests, Chi-square test, non-parametric tests), factor analysis (20% in total), ANOVA, correlations and factor analysis (10 % of each in total).

Findings on the use of resources to which authors of the publications referred are also interesting. In 45% of cases, authors of good practice examples, nor any resources not refer and 25% of authors can get by with only Czech publications. 60% of articles contained English literature, 80% of articles used Czech references, but nobody used literature written in languages other than English and Czech.

The range of contributions was from one page in the case of practical examples, to 26 pages for theoretical studies, the average value was 5.6 pages with a standard deviation of 6.67 and a median of 6.14 page, which means that most of the papers were in the range of 8 pages. It should be noted that the impact on the extent of the contribution has also the graphic design of the magazine, and the font size. Magazine Adult Education is printed in small letters and articles are very condensed, on the other hand Andragogic Revue or Aula use a format that is typical of the thesis and therefore, the posts are longer.

C) Discussion

Based on the results of the content analysis it is clear that selected magazines are devoted to the issue of e-learning and ICTs in education inadequate. The magazine Adult Education in the past attempted to solve this problem by issuing numbers of essays focused exclusively on this topic, but the author is not too reflected on this theme. Distribution of the sample corresponds to the fact that the analysed magazines are not very focused on academic research. We cannot also deduce the nationality of the authors and to find one certain university that has a significantly higher proportion of publications in journals monitored than others. It is noteworthy that it failed to show a high frequency of authors from Czech andragogic departments (from universities

from Prague, Brno, Olomouc and Ostrava), which can be explained by the fact that it is usually a small department, whose employees are more universal than oriented on special issues. On the other hand, e-learning in adult education deals with authors from different departments focus (economic or informatics).

The question is, in which journals Czech authors focusing on e-learning publish? The answer may already be referenced by research [1], from which it is apparent that the highest frequency of such contributions is in the journal e-Pedagogium. An interesting alternative is the Journal on Efficiency and Responsibility in Education and Science, published by the Czech Agricultural University in Prague. Another option is the Slovak Technologia education, issued by Constantine the Philosopher University in Nitra.

There are also other professional non-reviewed journals such Modern management. Another alternative are the magazines of foreign origin, mainly registered in databases Scopus and Web of Science, and finally (in terms of publication output probably the most numerous) are the collections either unrated or included in any of the databases.

5. Conclusion

Based on the results of the content analysis it is clear that selected magazines are inadequately devoted to the issue of e-learning and ICTs in education. The magazine Adult Education in the past attempted to solve this problem by issuing numbers of essays focused exclusively on this topic, but authors did not reflect this theme too much. Distribution of the sample corresponds to the fact that the analysed magazines are not very focused on academic research. We also cannot deduce the nationality of the authors and find one certain university that has a significantly higher proportion of publications in journals monitored than others. It is noteworthy that failed to a high frequency of authors from Czech andragogic departments (from universities from Prague, Brno, Olomouc and Ostrava), which can be explained by the fact that it is usually a small department, whose employees are more universal than specialized. On the other hand, e-learning in adult education deals with authors from different departments focus (economic or informatics).

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Acknowledgements

The research was supported by grant F2/50/2017 of Faculty of International Relations, University of Economics, Prague.

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