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Academic E-learning in Poland Results of a Diagnostic Survey

Abstract

Academic e-learning is not a new phenomenon world-wide or in Poland. However, there are only a few publications examining academic e-learning in Poland from a wider perspective (i.e., country-wide, and not only from that of the specific course, faculty member, or university orientation), and none of them present complex analysis and diagnosis. The goal of this paper is to present an investigation of academic e-learning in Poland in both public and private universities. The sample of 139 universities was surveyed, and relations between variables – such as e-learning process characteristics and university characteristics – were analysed via hypotheses testing. Results of the survey may constitute a basis for comparison on a national and international level and offer strategic directions for university authorities.

Keywords: academic e-learning, e-learning in Poland, diagnostic survey, dissemination of e-learning

Overview of Polish Academic E-learning

Polish academicians have been enriching didactics with various forms of Internet and modern information technologies (IT). Intensive development of e-learning in Poland, which has caused significant changes in didactics at most universities, is historic. One of the main drivers for e-learning development was financial support of European Union (EU) funds. Projects that were financed and supported covered implementations of e-learning platforms, development of multimedia educational materials, online courses and training, and conferences and workshops promoting e-learning. The second important factor was a change in the law in 2007, which mandated applications of distance learning methods and techniques. Consequently, increasing research interest in e-learning in Poland has led to much published work on a national level, but mainly in Polish.

E-learning is practised in many Polish universities, and its forms are varied. A research gap exists in the area. Specifically, it is the absence of complex research and its dissemination vis-à-vis e-learning on the national (Polish) level. The goal of this paper is to present results of an assessment of Polish academic e-learning (in both public and private facilities). For this purpose, literature was reviewed, forming the basis for an empirical research. Examination of basic characteristics and descriptive statistics, as well as statistical hypotheses testing was undertaken. The tested hypotheses related to relationships between e-learning unit (and process) characteristics and university characteristics.

Materials and Methods

State of the Art

Primary analysis was conducted using a query “e-learning in Poland” in the Web of Science database in December 2018. All citation indexes in the Web of Science were included. Other databases were not included. Sixty-nine papers were found; after abstract screening, however, only seven papers in English (six short conference papers and one journal paper) were included in the analysis. Secondary analysis was prepared by querying databases of Polish journals (*e-mentor*, *International Journal of Research in E-learning*), conferences (*eTEE*, *DLCC*, *VU*), websites of centres and associations (PTNEI, SEA), and monographs widely disseminated in the e-learning environment. Numerous papers were found that were related to teaching of specific subjects, modules, courses, and degrees (e.g. Helenowska-Peschke, 2017). Such work was omitted, as it was not relevant to the scope of this study. There is absence of empiricism that has been undertaken

using a complex approach to the dissemination of e-learning in Polish universities and the role of e-learning in didactics.

Those few publications (Table 1) address the following issues:

- quantitative fragmentary research, including satisfaction of stakeholders, efficiency and effectiveness of didactics, dissemination from university type perspective, and province perspective;
- qualitative research related to implementation cases studies and comparative analysis from faculty or university perspective, as well as practices of dedicated university-wide e-learning units.

Table 1.

Implementations of academic e-learning in Poland in the literature

Type	Scope	Publication
Quantitative	Satisfaction of students and/or employees	Chomczyński, 2015; Dąbrowski, 2005; Kierzek & Tyburski, 2005; Szadziewska & Kujawski, 2017; Szadziewska & Kujawski, 2016; Woźniak-Zapór et al., 2016
	Motivations	Rawa-Kochanowska, 2012; Wolski, 2011
	Efficiency of didactics	Betlej, 2011; Klimas, 2015; Kwiatkowska, 2007; Ordon & Sołtysiak, 2011
	Effectiveness of didactics	Bizon, 2010; Bizon, 2012; Kula & Plebańska, 2011
	Quality of education	Zalewska, 2015
	Platforms	Redlarski & Garnik, 2014
	University type-wide	Radkowska & Radkowski, 2005
	Province-wide	Eisenbardt, 2007
	Country-wide	Hołowiecki, 2014; Kraski, 2006; Kraski, 2007; Kraski, 2008; Kraski, 2009; Maleńczyk, 2015; Pleśniarska, 2016
Qualitative	Academic e-learning unit	Królikowski & Susłow, 2010; Kula & Plebańska, 2012; Pańska, 2012
	Faculty-wide	Grzeszczyk, 2010
	University-wide	Binda & Stofkova, 2017a; Binda & Stofkova, 2017b; Lenkiewicz et al., 2010; Paliwoda-Pekosz & Stal, 2015; Pokojski et al., 2011; Rutkowski et al., 2008
	Comparative (university-wide)	Gajewski & Jarosińska, 2011; Jaworska et al., 2018; Kisielnicki & Nowacka, 2013; Zajac, 2005
	Country-wide	Turula, 2015

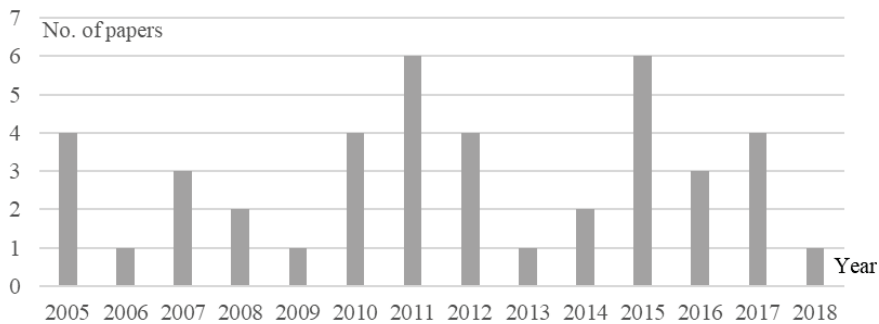


Figure 1. Analysed publications per year.

The momentums of Polish researchers' interest in the dissemination of their e-learning activities (not limited only to specific subjects, modules, courses, and degrees) were 2011 and 2015 (Figure 1). However, even then it was rather moderate, as maximum value was 6 papers in 2011. The historical yearly distribution of papers is probably a derivative of intensive implementations in that period and a number of EU-supported projects in Poland at that time. However, literature review per se (in any of its various forms, such as systematic literature review) is not the goal of this paper, nor the history and evolution of academic e-learning in Poland is. It may be the topic of separate and extended studies themselves. Therefore, the authors decided to limit the content of literature analysis section to pointing to the evidence of the existing research gap, which is the lack of holistic and up-to-date view of Polish academic e-learning. This gap determined goals discussed in the next section.

There was also the second gap identified, that is, the lack of up-to-date extended qualitative research on e-learning in Polish universities, including case studies, best practices, etc., to analyse contextual issues and phenomena of academic e-learning in Poland. For example, there was no follow-up of research on e-learning best practices conducted by Zajac (2005). Turula (2014) provided qualitative discussion of Polish academic e-learning, its dominant prescriptive and control-based character and small differentiation of forms. However, her research does not reflect on quantitative data proving qualitative analysis. The second gap is not addressed in the presented paper.

The most complex research found was a diagnosis of e-learning in public higher education (Pleśniarska, 2016) and analysis of the use of e-learning in Poland (Maleńczyk, 2015) (the only one country-wide paper in English). Both efforts, though, were not focused on academic e-learning centralised units, which is the subject of this article. Hołowiecki (2014) analysed the use of academic e-learning in Poland. This work is also limited. It is only partially of quantitative nature and covers only public universities. It answers research questions related to the presence (or its lack), reasons and processes of implementation and financing (or its

lack), and basic features of e-learning platforms. Therefore, it does not provide the full picture of Polish academic e-learning. No existing work was found that presented a synthesis of country-wide research on academic e-learning. This issue has been addressed by Kraski (2006; 2007; 2008; 2009), but not comprehensively and it is outdated. All works discussed in this paragraph do not present statistical hypotheses testing for descriptions of characteristics and regularities in Polish academic e-learning.

With few English papers available, comparing specifics of academic e-learning in Poland with other countries is difficult. Additionally, it seemingly makes it impossible to place it in the wider context and disseminate results internationally. This paper contributes to the body of knowledge by approaching these twin weaknesses of existing relevant research.

Research Procedure

The general research goal was to diagnose the use of e-learning in Polish universities, both public and private ones. Detailed goals were as follows:

G1. Identification of academic units responsible for e-learning, with a specific focus on organisational, educational, and technological aspects.

G2. Identification of relationships between the use of e-learning and selected characteristics of universities (e.g., legal status, size).

G3. Identification of design of models of e-learning in universities.

G4. Identification of internal and external determinants of e-learning characteristics (strengths, weaknesses, potential, constraints) in the context of e-learning development.

G5. Identification of the needs of universities considering assessment of effectiveness of e-learning activities.

G6. Identification of key factors determining e-learning effectiveness from the perspective of stakeholders.

The research was multi-phase, using both quantitative and qualitative data, and focused on the following research questions:

Q1. What is the scale of dissemination of e-learning in Polish universities?

Q2. What organisational units are responsible for academic e-learning?

Q3. Are the size of university and number of students' user accounts correlated?

Q4. Are the size of university and number of exploited platforms correlated?

Q5. Are the size of university and existence of dedicated e-learning unit correlated?

Q6. Are the duration of the use of e-learning and the size of e-learning unit (number of employees) correlated?

Q7. Are the duration of the use of e-learning and the existence of dedicated e-learning unit correlated?

Q8. Are the existence of dedicated e-learning unit and the existence of full online studies correlated?

Q9. Are the existence of dedicated e-learning unit and the use of e-learning quality assurance procedures correlated?

Q10. Are the number of user accounts and the size of e-learning resources (modules/courses) correlated?

Q11. What are the procedures of e-learning activities assessment applied by universities?

Q12. Is the need for the structured assessment and monitoring of academic e-learning units articulated?

Q13. Which factors are critical in the assessment of academic e-learning units' effectiveness?

Q3–Q10 were transformed into hypotheses for statistical testing for the population of all Polish universities, public and private ones.

Pragmatism guided the research. Mixed, complex (multi-phase) methods were used. The approach was heterogeneous. The main research was divided into four phases (Table 2).

Table 2.
Research procedure

Phase	Scope, methods, tools, techniques
0	0.1 State-of-the-art of e-learning in Polish universities Analysis of existing data (secondary sources: Internet, reports, internal documentation), electronic media monitoring (press clipping), phone interview
	0.2 Verification and selection of academic e-learning units
	0.3 Selection of experts from academic e-learning units
1	1.1 Collection of data on the use of e-learning in universities Diagnostic survey; free-targeted interview; interview scenario with a list of desired data
	1.2 Detailing research area (boundaries and limitations of further research)
2	2.1 Gathering quantitative data on academic e-learning units Diagnostic survey; traditional or electronic survey; survey questionnaire
	2.2 Design of e-learning models
	2.3 Results analysis
	2.4 Statistical verification hypotheses
3	3.1 Individual in-depth interviews
	3.2 Results analysis and recommendations

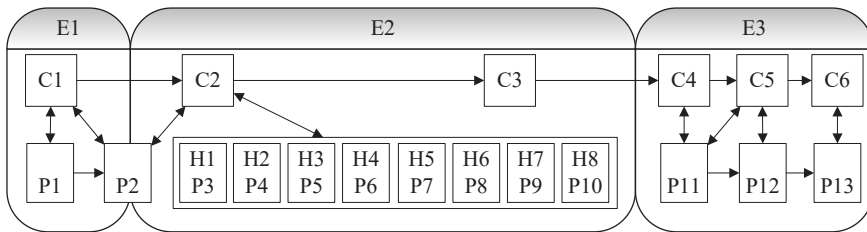


Figure 2. Research model.

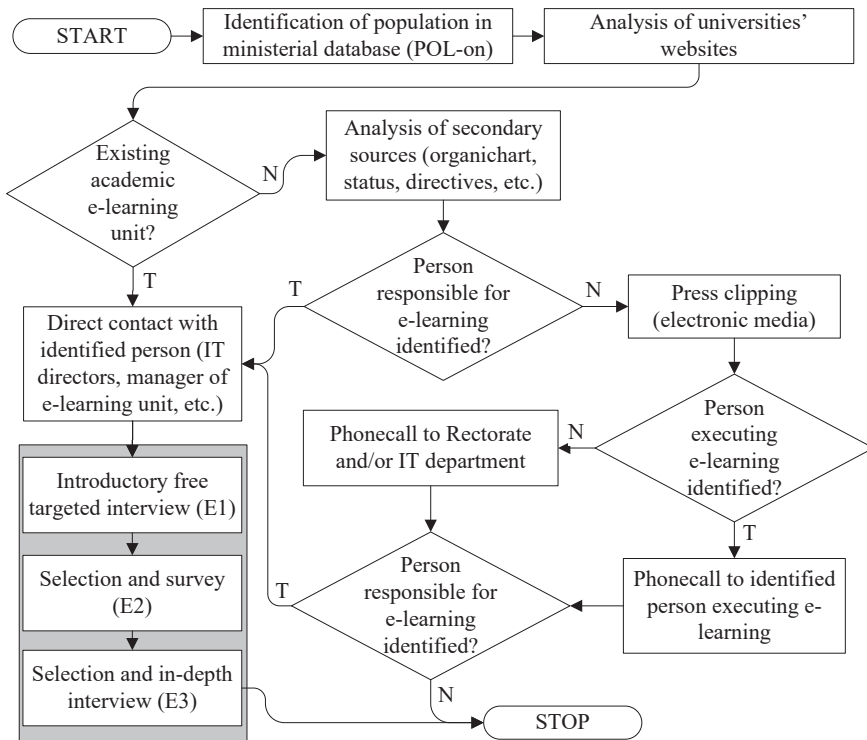


Figure 3. Research procedure.

Goals, questions, and hypotheses are presented on the research model (Figure 2). Pilot research was conducted to test research assumptions. Sampling was purposive. The entire population of Polish universities was approached based on data available from the government (Ministry of Science and Higher Education of the Republic of Poland, POLON database available at <https://www.polon.nauka.gov.pl>). The survey was (and also interviews, planned in further research, will be) directed to employees responsible for implementation or coordination of e-learning, decision makers, or influencers (directors/managers of units, specialists, pro-rectors and their deputies for e-learning). The research procedure is depicted on Figure 3.

The questionnaire was anonymous and included 27 questions subdivided into four groups: particulars, characteristics, didactics, technology. Survey results were crosschecked with results of introductory (free targeted) interviews and secondary sources (see phase 0.1 and 1.1 in Table 2, see Figure 3). When feasible, chi-square analyses were applied to test the hypotheses. Chi-square analyses were not used when there was an insufficient number of categories. The U Mann-Whitney test was utilised to test differences between medians. The Shapiro-Wilk test was employed to test normality of a distributions. Pearson's r 's and Spearman's rank correlation coefficients were calculated. When the study was undertaken, there were 410 Polish universities, including 141 public and 269 private ones.

Subsequent sections focus on phases 0–2 (see Table 2).

Results

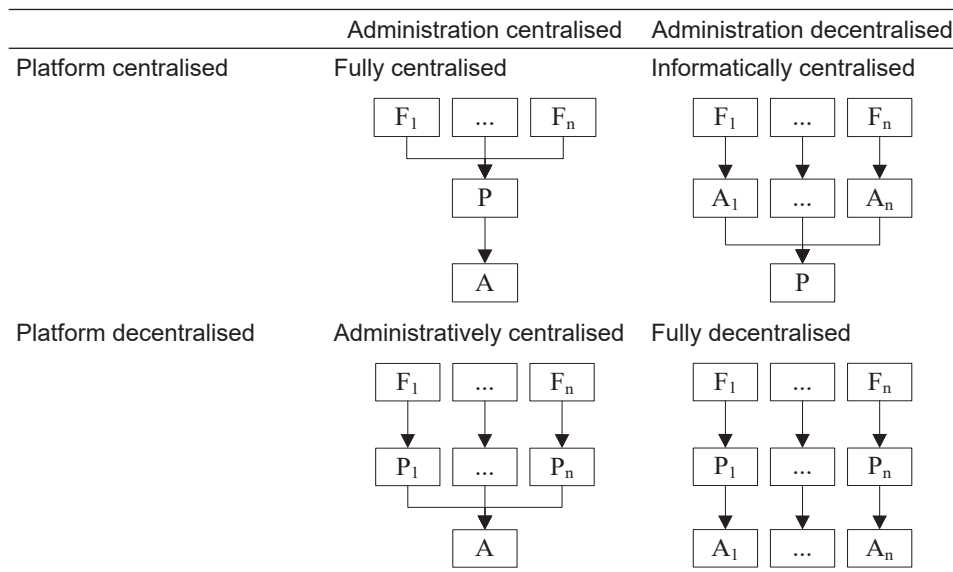
Introductory Free-targeted Interview

A conceptual constraint was the interpretation of e-learning terminology. Therefore, terminology was carefully explained to interviewees concerning what e-learning meant in the research, i.e., educational process (learning and teaching), in which the knowledge is delivered using modern IT and Internet, specifically, and communication/interaction between all the stakeholders is fully or partially supported by electronic channels (synchronously and/or asynchronously). Another assumption for units selected for the investigation was that the unit is in the development or maturity stage of a lifecycle. Units implementing, testing, piloting, or terminating e-learning did not illustrate sufficient experience with e-learning, as those phases are changing too dynamically. Interviews showed high diversity of the form in which e-learning is practised in Polish universities (Table 3). A total of 256 introductory free-targeted interviews were conducted (Figure 3).

Another study problem was identification of relevant e-learning authorities. As such, this necessitated contacting multiple individuals within a university to obtain formal approval for research. Some individuals rejected participation in the study, owing to revelation of confidential data. Some private universities employed IT staff on a contractor basis, so contact with them was difficult (mainly via e-mail). Therefore, those universities without permanent IT staff were excluded from the study.

Another difficulty was an effect of the dynamics of private universities (i.e., liquidations, ownership changes, consolidations, and transformation of different types [e.g. new name]). This dynamism typically led to a change of strategy with regard to e-learning.

Table 3.
Academic e-learning models in Poland concerning administration and IT



Note: A – administration; F – faculty; P – platform.

Grounding on interviews, fraction of universities declaring the use of e-learning and fraction of universities conforming research sample purpose were estimated, accordingly with indicators of the structure of a population. Public universities were grouped according to their teaching profile, as in ministerial registers (Table 4); private universities were categorised by province (Table 5).

Slightly more than 75% of all public universities used e-learning. All economic, pedagogical, nature, medical, maritime, military, state services, and physical education universities used e-learning. One university of technology and one general (academy) university revealed a lack of e-learning. E-learning was markedly less popular in professional (state higher professional schools) (ca. 70% used it) and church and theology universities (above 50%). Use of e-learning in art universities, however, was relatively unpopular (below 25%).

Slightly more than 50% of private universities used e-learning. There were significant differences between provinces. All universities located in Warmia-Masuria, with over 70% located in Lubelskie, Pomerania, and Greater Poland used e-learning. None located in Lubuskie used it.

Table 4.
E-learning in Polish public universities

Profile*	N	U _w	W _w	U _d	W _d	W _d '	U _b	W _z	Remarks**	
									a)	b)
Art	19	4	0.21	2	0.50	0.11	0	0.00	5P,1H	2L
Economy	5	5	1.00	5	1.00	1.00	5	1.00	-	-
Medicine	10	10	1.00	6	0.60	0.60	2	0.33	-	3R,1K
Naval	2	2	1.00	1	0.50	0.50	0	0.00	-	1R
Pedagogy	5	5	1.00	4	0.80	0.80	3	0.75	-	1R
Nature	6	6	1.00	2	0.33	0.33	2	1.00	-	4R
State services	2	2	1.00	2	1.00	1.00	1	0.50	-	-
Technology	18	17	0.94	15	0.88	0.83	14	0.93	-	2R
General (academies)	18	17	0.94	15	0.88	0.83	11	0.73	1H	1R,1S
Military	5	5	1.00	3	0.60	0.60	1	0.33	-	2R
Physical education	6	6	1.00	4	0.67	0.67	3	0.75	-	1R,1T
Professional	36	25	0.69	16	0.64	0.44	14	0.88	4H	3R,2T,4W
Others***	9	5	0.56	3	0.60	0.33	3	1.00	-	2R
SUM	141	109	0.77	78	0.72	0.55	59	0.76	-	-

Note: * – profiles were taken from POLON database, ** – a) declared lack of the use of e-learning; b) declared the use of e-learning, but not conformed with assumptions; *** – declared the use of e-learning, but not conformed with assumptions.

Legend:

$$N=U_{\{w\}}+U_{\{n(P,H,D)\}} \quad (1)$$

$$U_{\{d\}}=U_{\{w\}}-(L,\ K,\ R,\ W,\ T,\ S) \quad (2)$$

$$W_w=U_w/N \quad (3)$$

$$W_d=U_d/U_w \quad (4)$$

$$W_d'=U_d'/N \quad (5)$$

$$W_z=U_b/U_d \quad (6)$$

H – declared former use of e-learning and lack of current use

K – e-learning only for trainings (e.g. librarian, safety & health, etc.)

L – e-learning only in foreign languages education

N – overall number of universities

P – planning/initiating phase of e-learning

R – fully decentralised e-learning

T – test/pilot phase of e-learning

S – closure phase of e-learning

U_n – declared lack of the use of e-learning

U_b – number of researched universities that conformed to research assumptions

U_d – number of universities conformed with research assumptions

U_w – declared the use of e-learning

W – implementation phase of e-learning

W_d – indicator of the use of e-learning in universities conformed to research assumptions

W_d' – indicator of conformance with research assumption by universities that declared the use of e-learning

W_w – indicator of the use of e-learning in universities

W_z – return indicator (ratio of researched universities in those which conformed to research assumption)

Table 5.
E-learning in Polish private universities

Profile*	N	U _w	W _w	U _d	W _d	W _d '	U _b	W _z	Remarks**	
									a)	b)
Lower Silesia	21	13	0.62	11	0.85	0.52	5	0.45	1P,1H	1W,1T
Kuyavia-Pomerania	15	10	0.67	10	1.00	0.67	6	0.60	1P,1H	-
Lubelskie	9	7	0.78	7	1.00	0.78	5	0.71	1P	-
Lubuskie	4	0	0.00	0	n/a	0.00	0	n/a	-	-
Lodzkie	19	10	0.53	8	0.80	0.42	3	0.38	1D	1W,1T
Lesser Poland	14	9	0.64	7	0.78	0.50	6	0.86	2P,1H	1T
Mazovia	73	34	0.47	28	0.82	0.38	22	0.79	4P,6H,4D	2S,1T,3W
Opolskie	2	1	0.50	1	1.00	0.50	1	1.00	1P	-
Podkarpackie	9	3	0.33	3	1.00	0.33	2	0.67	2H	1W
Podlasie	12	6	0.50	6	1.00	0.50	3	0.50	1H,1D	-
Pomerania	18	13	0.72	9	0.69	0.50	7	0.78	1H	1R,2W,1T
Silesia	28	14	0.50	10	0.71	0.36	4	0.40	1H	1R,2W,1T
Swietokrzyskie	9	2	0.22	2	1.00	0.22	2	1.00	2P	-
Warmia-Masuria	4	4	1.00	3	0.75	0.75	2	0.67	-	1K
Greater Poland	22	17	0.77	15	0.88	0.68	8	0.53	1P,1H	1S,1W
West Pomerania	10	4	0.40	4	1.00	0.40	4	1.00	2H,1D	-
SUM	269	147	0.55	124	0.84	0.46	80	0.65	-	-

Note: * – a) declared lack of the use of e-learning; b) declared the use of e-learning, but not conformed with assumptions.

Legend: see Table 4.

A majority of Polish universities (62.4%) declared that they implemented e-learning, but only 49% (of all universities) confirmed the assumptions for purposive sampling. There was a fraction of universities that closed (5.6%) or were in the closure phase of (1%) e-learning activities, mainly owing to usage of all external funds (EU projects), lack of teacher motivation, and insufficient skill and competence of academic staff (mainly full professors). One percent applied e-learning platforms only for particular courses (including language teaching). Twenty four universities (5.9%) were in the implementation, testing, or pilot phase, and eighteen (4.3%) were in the planning phase. Approximately five percent utilised a fully decentralised e-learning model (see Table 3), but only two of those were private and eighteen were public. Centralisation of e-learning was mainly driven by gaining experience and advancement in e-learning activities.

Survey

Descriptive statistics. General descriptive statistics are presented in this section. The dataset is available upon request of the authors.

Most respondents were actively practising and managing e-learning with much professional experience (directors of e-learning units, platform administrators, specialists for e-learning) (Table 6). The survey was completed (and positively crosschecked with introductory free-targeted interviews and secondary sources, e.g. internal regulations) by 139 universities, 80 private and 59 public ones.

Table 6.
Structure of respondents

Position	Private universities	Public universities
Director/manager of e-learning unit	26.3%	27.1%
Platform administrator	23.8%	28.8%
Specialists for e-learning	22.5%	16.9%
IT specialists	12.5%	8.5%
Other	7.5%	6.8%
Methodologist of e-learning	3.8%	3.4%

Public universities significantly more often (49.2%) had a centre for e-learning in their structure than private universities did (26.3%). Chi-square tests revealed a statistically significant correlation between type of university and type of e-learning academic unit in the university (Table 7). There was no significant correlation found between period of the use of e-learning and type of university ($p > 0.05$, Table 8). Position of e-learning unit in the university structure was significantly correlated with the type of university ($p < 0.05$, Table 9).

Table 7.
Structure of academic e-learning units

Type of academic unit responsible for e-learning	Private	Public
Centre for e-learning	26.3%	49.2%
IT department	38.8%	27.1%
Lack	27.5%	16.9%
Other	7.5%	6.8%
$\chi^2 = 7.98$	$p = 0.046$	

Table 8.
E-learning maturity in years

E-learning maturity in years	Private	Public
15 and more	8.8%	8.5%
10 – 14	21.3%	23.7%
6 – 9	23.8%	33.9%
3 – 5	27.5%	23.7%
2 and less	18.8%	10.2%
$\chi^2 = 3.18$	$p = 0.53$	

Table 9.
E-learning position in organisational structure

Superior position	Private*	Public
Rector's deputy	13.8%	49.2%
Rector	31.3%	18.6%
Chancellor	25.0%	23.7%
Other	21.3%	8.5%
Dean	8.8%	0.0%
$\chi^2 = 25.56$	$p = 0.00$	

Note: * The sum is not equal to 100% due to rounding.

Public universities significantly more often placed e-learning units under the rector's deputy supervision (49.2%). Average employment in academic e-learning units was higher in public (4.42 FTE) than in private (2.95 FTE) universities. A Mann-Whitney U test ($p < 0.05$) showed that the number of employees was dependent on the type of university (Table 10). No significant relationship between existence of advisory body for e-learning and the type of university was found, nor was the existence of methodologists of e-learning and the type of university (Table 11). E-learning activities were chiefly financed from central university budgets (both in public and private universities), and EU funds were no longer significant source of cashflow (Table 12).

Table 10.
E-learning unit employment

	Private	Public
Average number of employees of e-learning unit	2.95	4.42
$Z = 2.36$	$p = 0.02$	

Table 11.

Existence of advisory boards and methodologists of e-learning

Experts supporting e-learning unit			Private	Public
Advisory board	$\chi^2 = 25.56$	$p = 0.02$	38.8%	45.8%
Methodologist	$\chi^2 = 25.56$	$p = 0.02$	38.8%	33.9%

Table 12.

Main sources of finance for e-learning

Source of financing	Private	Public
Central university budget	78.8%	74.6%
Other	7.5%	15.3%
Self-financing	13.8%	5.1%
EU funds	0.0%	3.4%
Not applicable	0.0%	1.7%

There was a statistically significant relationship between the type of e-learning activity executed in the university and the type of university (i.e., online studies were more frequently in private universities [37.5%], but other activities [e-learning courses and trainings] were not dependent on the type of university). There was a statistically significant relationship between the level of studies and the type of university. Public universities more frequently (44.1%) applied e-learning on the tertiary level (PhD) of higher education. For the bachelor level, a chi-square test could not be applied because of a nonsufficient sample. For masters and postgraduate education, there were no statistically significant relationships. The number of full-time students supported by e-learning showed a statistically significant relationship to the type of university. The part-time students, however, showed no statistically significant relationship. No statistically significant relationship was found between the form of classes and the type of university. A statistically significant relationship between the target groups of e-learning training and the type of university was found: public universities more frequently (69.5%) applied e-learning for instructional courses for their staff (Table 14, Table 13).

There was no statistically significant relationship between the existence of standards for e-books development and the type of university (39.0% of public and 53.8% of private applied standards). There was a statistically significant relationship between the existence of e-learning evaluation procedures and the type of university. Public universities used evaluation procedures more frequently than private universities did (45.8% versus 21.3%) (Table 14).

Table 13.

Types of e-learning activities, levels and types of e-learning studies, forms of e-learning classes, target groups of e-learning trainings

E-learning activity	Private	Public	Statistical significance
Specific e-courses (subjects, modules, etc.)	91.3%	94.9%	$\chi^2=0.68$; df=1; p=0.41
Specific e-trainings	78.8%	89.8%	$\chi^2=3.03$; df=1; p=0.08
Online studies curricula	37.5%	11.9%	$\chi^2=11.42$; df=1; p=0.00
Bachelor	100.0%	94.9%	χ^2 not applicable
Master	81.3%	81.4%	$\chi^2=0.00$; df=1; p=0.99
Tertiary (PhD)	6.3%	44.1%	$\chi^2=28.03$; df=1; p=0.00
Postgraduate / MBA	66.3%	52.5%	$\chi^2=2.69$; df=1; p=0.10
Full-time	72.5%	94.9%	$\chi^2=11.57$; df=1; p=0.00
Part-time	98.8%	93.2%	χ^2 not applicable
Lectures	91.3%	96.6%	χ^2 not applicable
Exercises	91.3%	91.5%	$\chi^2=0.00$; df=1; p=0.95
Lectureships (language)	52.5%	61.0%	$\chi^2=1.00$; df=1; p=0.32
Seminars	42.5%	52.5%	$\chi^2=1.38$; df=1; p=0.24
Projects	31.3%	45.8%	$\chi^2=3.05$; df=1; p=0.08
Laboratories	33.8%	37.3%	$\chi^2=0.19$; df=1; p=0.67
Instruction students training	60.0%	74.6%	$\chi^2=3.22$; df=1; p=0.07
Instruction staff trainings	41.3%	69.5%	$\chi^2=10.88$; df=1; p=0.00
Additional students' training	45.0%	45.8%	$\chi^2=0.01$; df=1; p=0.93
Open for individuals	20.0%	15.3%	$\chi^2=0.52$; df=1; p=0.47
Tailored for organisation	18.8%	15.3%	$\chi^2=0.30$; df=1; p=0.59
Others	6.3%	5.1%	χ^2 not applicable

Table 14.

Quality assurance of e-learning didactics

Position	Private	Public	Statistical significance
Standards for e-books development in place	53.8%	39.0%	$\chi^2=2.97$; df=1; p=0.08
Evaluation procedures in place	21.3%	45.8%	$\chi^2=9.43$; df=1; p=0.00

Interestingly, the fraction of universities that applied standards and procedures seemed to be relatively low, yet one conceivably would expect that such procedures should be in place in any university. Private universities more frequently (67.5% versus 16.9%) shared audiovisual files, while public universities more frequently (76.3% versus 3.8%) shared ePUB files. Webinars were more frequently used in private universities (27.5% versus 13.6%), but synchronous communication tools showed no statistically significant relationship to the type of university.

Synchronous communication tools were used relatively rarely, and text chat was the most popular among them – but even it was not applied widely (71.3% of private and 55.9% of public). A chi-square test manifested a relationship ($\chi^2=4.23$, $p=0.04$) between integration of e-learning platform with information systems and the type of university. However, the number of universities that integrated e-learning platform with other information systems was relatively low (40.0% of private and 57.6% of public) (Table 15).

Table 15.

Shared files, synchronous communication tools

File type	Private	Public	Statistical significance
PDF	97.5%	93.2%	χ^2 not applicable
MS Office/ ODF	85.0%	86.4%	$\chi^2=0.06$; $df=1$; $p=0.81$
HTML/XHTML	68.8%	71.2%	$\chi^2=0.10$; $df=1$; $p=0.76$
Audiovisual	67.5%	16.9%	$\chi^2=34.93$; $df=1$; $p=0.00$
ePUB	3.8%	76.3%	$\chi^2=79.00$ $df=1$; $p=0.00$
LaTeX	3.8%	5.1%	$\chi^2=0.15$; $df=1$; $p=0.70$
Text chat	71.3%	55.9%	$\chi^2=3.49$; $df=1$; $p=0.06$
Videoconference	33.8%	23.7%	$\chi^2=1.64$; $df=1$; $p=0.20$
None	21.3%	32.2%	$\chi^2=2.12$; $df=1$; $p=0.15$
VoIP	25.0%	27.1%	$\chi^2=0.08$; $df=1$; $p=0.78$
Webinars	27.5%	13.6%	$\chi^2=3.90$; $df=1$; $p=0.048$
Multimedia table	13.8%	15.3%	$\chi^2=0.06$; $df=1$; $p=0.80$
Virtual class	11.3%	13.6%	$\chi^2=0.17$; $df=1$; $p=0.68$

Note: Multiple choice was possible.

A Mann-Whitney U test revealed a statistically significant relationship between the type of university and the following variables:

- average number of resources available on an e-learning platform ($Z=2.08$, $p=0.04$), which was significantly higher in public universities (570 versus 406);
- average number of student accounts on e-learning platform ($Z=4.94$, $p=0.00$), which was higher in public universities (7847 versus 1841);
- average number of teacher accounts on e-learning platform ($Z=3.38$, $p=0.00$), which was higher in public universities (281 versus 88).

That was expected as public universities are generally bigger.

Statistical verification of hypotheses. Eight hypotheses were formulated (H1–H8).

H1. The size of the university (number of students) and number of active student accounts on e-learning platform are correlated.

H2. The size of the university and the number of used e-learning platforms are correlated.

H3. The size of the university and the existence of e-learning dedicated unit are correlated.

H4. The time of e-learning implementation and the number of employees responsible for e-learning are correlated.

H5. The time of e-learning implementation and the existence of e-learning dedicated unit are correlated.

H6. The existence of an e-learning dedicated unit and the delivery of full online studies are correlated.

H7. The existence of an e-learning dedicated unit and application of quality assurance procedures for e-learning are correlated.

H8. The number of student and teacher accounts and the number of resources (subjects/courses) on e-learning platform are correlated.

Each hypothesis was formulated in three variants, i.e. for all researched Polish universities (x.1), for all researched private Polish universities (x.2), for all researched public Polish universities (x.3). Results of the hypothesis tests are presented in Table 16.

University sizes were categorised as follows:

(1) public universities:

- small: fewer than 10000 students, 31 universities;
- medium: from 10000 to 20000 students, 15 universities;
- large: from 20001 to 30000, 8 universities;
- very large: over 30000 students, 5 universities;

(2) private universities:

- small: fewer than 2000 students, 57 universities;
- medium: from 2000 to 5000 students, 15 universities;
- large: from 5001 to 9000 students, 5 universities;
- very large: over 9000 students, 3 universities.

Table 16.
Statistical verification of hypotheses

Hypothesis	Pearson's r / Spearman's rs / χ^2	Correlation	Significant difference	Significance level p
H1	1.1 r=0.73	Strong		<0.05
	1.2 0.89	Very strong		<0.05
	1.3 0.63	Strong		<0.05
H2	2.1 rs=0.21	Weak		<0.05
	2.2 0.11	Very weak		>0.05
	2.3 0.30	Weak		<0.05
H3	3.1 rs=0.23	Weak		<0.05
	3.2 0.17	Very weak		>0.05
	3.3 0.27	Weak		<0.05
H4	4.1 rs=0.43	Moderate		<0.05
	4.2 0.46	Moderate		<0.05
	4.3 0.36	Weak		<0.05
H5	5.1 rs=0.19	Very weak		<0.05
	5.2 0.17	Very weak		>0.05
	5.3 0.19	Very weak		>0.05
H6	6.1 $\chi^2=0.05$; df=1		No	>0.05
	6.2 0.02; 1		No	>0.05
	6.3 0.04; 1		No	>0.05
H7	7.1 E-book standards $\chi^2=8.43$; df=1		Yes	<0.05
	Evaluation procedures 0.14; 1		No	>0.05
	7.2 E-book standards 5.87; 1		Yes	<0.05
	Evaluation procedures 0.04; 1		No	>0.05
	7.3 E-book standards 4.25; 1		Yes	<0.05
	Evaluation procedures 0.98; 1		No	>0.05
H8	8.1 Students accounts r=0.34	Weak		<0.05
	Teachers accounts 0.42	Moderate		<0.05
	8.2 Students accounts 0.53	Moderate		<0.05
	Teachers accounts 0.70	Strong		<0.05
	8.3 Students accounts 0.33	Weak		<0.05

Note: Correlation strength was assumed as by Evans (1996), i.e., coefficient equal 0 then no correlation, (0.00;0.20) – very weak, <0.20;0.39) – weak, <0.40;0.59) – moderate, <0.60;0.79) – strong, <0.80;1.00) – very strong, 1 – perfect.

n=139 (all), n=80 (private), n=59 (public).

Discussion and Conclusions

There were several constraints while conducting the study interviews and survey. These were mainly related to organisational issues and difficulties with reaching trustable data. Therefore, survey results were verified and cross-checked with the results obtained from secondary sources and introductory free-targeted interviews.

The majority of universities used e-learning, but slightly less than 50% conformed to assumptions of purposive sampling: definition and scope of e-learning (in order to extract universities using e-learning only for training, but not for regular teaching), and the phase of the e-learning life cycle in the university (in order to eliminate units in implementation, testing, pilot, and closure phases).

Polish academic e-learning units were rather small (fewer than five employees [FTE] in public and fewer than three in private universities, on average). Also, advancement of e-learning tools varied significantly. On average, however, a relatively small group utilised a structured methodological support (advisory boards and/or methodologists) and quality assurance (e-books standards and/or evaluation procedures). This seems to be an area for potential improvement.

The size of the university and the number of active students' user accounts on e-learning platform were positively correlated for public, private, and total group of universities. The size of the university and the number utilising e-learning platforms were positively correlated for public and total group of universities, but for private universities it was not possible to confirm that relationship.

The size of the university and the existence of an e-learning dedicated unit were correlated for public and total group of universities, but for private universities it was not possible to confirm that relationship. E-learning maturity (measured in years of usage) and the number of employees (FTE) responsible for e-learning were positively correlated for public, private, and total group of universities. E-learning maturity and the existence of an e-learning dedicated unit showed a statistically significant relationship for the total group of universities, but no such conclusion could be made for public and private universities separately. The existence of an e-learning dedicated unit and conducting of full online studies were not statistically significantly related for public, private, or the total group of universities. Many universities (107) had an e-learning dedicated unit, but only less than 30% were conducting full online studies. It is due to the fact that sub-groups of private and public were not numerous enough to prove dependency.

The existence of quality assurance for e-learning was analysed in two dimensions: (1) use of standards for e-books development, (2) use of evaluation procedures for e-learning didactics. The relationship between the first dimension and the existence of an e-learning dedicated unit was statistically significant for the public, private, and total group of universities. However, for the second

dimension, this finding was not obtained. A positive correlation between the number of resources on an e-learning platform and the number of active teacher accounts was found for the public, private, and total group of universities. The same result was observed for the number of active students' user accounts, and the sum of teachers' and students' user accounts.

This study may offer practitioners, researchers, and educators a framework for undertaking similar research not only in higher education, but also in primary, junior high, and high schools. Therefore, comparative analysis on a national and regional level would be possible, thus permitting examination of differences and similarities concerning characteristics of economies, societies, demographics, and educational systems. The study results constitute a basis for further qualitative research: individual in-depth diagnostic interviews to find context, opinions, approaches, needs, dimensions, and tools employed for assessment of e-learning units' effectiveness, and design and verification of an integrated method of assessment of e-learning academic units, which possibly will be the subject of publishing in the future.

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Izabela Maleńczyk, Bartłomiej Gładysz

E-learning akademicki w Polsce – wyniki sondażu diagnostycznego

Streszczenie

E-learning akademicki nie jest zjawiskiem nowym na świecie, ani w Polsce. Jednakże publikacje podejmujące tematykę e-learningu w Polsce z szerszej perspektywy (tj. kraju, a nie jedynie przedmiotów, wydziałów czy uniwersytetów) są nieliczne. Żadna z tych publikacji nie prezentuje kompleksowej analizy i diagnozy. Celem niniejszego artykułu jest prezentacja diagnozy e-learningu akademickiego w Polsce zarówno dla publicznych, jak i prywatnych uczelni. Diagnozę przeprowadzono dla próby 139 uczelni. Przeprowadzono statystyczną weryfikację hipotez dla zależności pomiędzy zmiennymi opisującymi proces e-learningu a zmiennymi opisującymi uczelnię. Wyniki diagnozy mogą stanowić podstawę porównań zarówno na poziomie krajowym, jak i międzynarodowym, a także bazę dla wytyczania kierunków strategicznych przez władze uczelni.

Słowa kluczowe: e-learning akademicki, e-learning w Polsce, sondaż diagnostyczny, upowszechnienie e-learningu

Izabela Maleńczyk, Bartłomiej Gładysz

Академическое электронное обучение в Польше: результаты диагностического исследования

Аннотация

Академическое электронное обучение не является новым явлением ни в мире, ни в Польше. Тем не менее, существует всего несколько публикаций, в которых рассматривается академическое электронное обучение в Польше с более широкой точки зрения (то есть, по всей стране, а не только в контексте конкретного курса, преподавателя или ориентации в университете), и ни в одной из них не представлен комплексный анализ и диагностика. Цель данной статьи – представить исследование академического электронного обучения в Польше как в государственных, так и в частных университетах. Выборка из 139 университетов была исследована, и отношения между переменными, такими как характеристики процесса электронного обучения и характеристики университета, были проанализированы с помощью проверки гипотез. Результаты опроса могут послужить основой для сравнения на национальном и международном уровнях и предложить стратегические направления для руководства университета.

Ключевые слова: академическое электронное обучение, электронное обучение в Польше, диагностическое обследование, распространение электронного обучения

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E-learning académico en Polonia: resultados de una encuesta de diagnóstico

R e s u m e n

El e-learning académico no es un fenómeno nuevo ni en todo el mundo ni en Polonia. Sin embargo, solo hay unas pocas publicaciones que examinan el aprendizaje electrónico académico en Polonia desde una perspectiva más amplia (es decir, en todo el país y no solo desde el curso específico, el miembro del profesorado o la orientación universitaria) y ninguna de ellas presenta análisis y diagnósticos complejos. El objetivo de este trabajo es presentar una investigación del e-learning académico en Polonia en universidades públicas y privadas. Se encuestó a la muestra de 139 universidades y se analizaron las relaciones entre variables, como las características del proceso de aprendizaje electrónico y las características de la universidad, a través de pruebas de hipótesis. Los resultados de la encuesta pueden constituir una base para la comparación a nivel nacional e internacional y ofrecer direcciones estratégicas para las autoridades universitarias.

P a l a b r a s c l a v e: e-learning académico, e-learning en Polonia, encuesta de diagnóstico, difusión del e-learning