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Promoting the development of information thinking (PRIM)

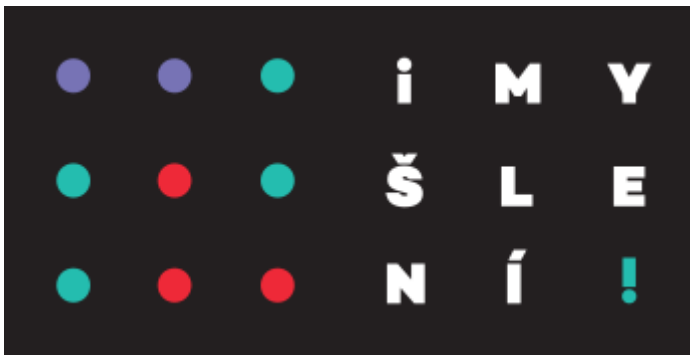
Dear readers and authors of articles in our magazine. Let me mention one of the key projects that will affect the teaching of computer science at Czech schools. For this reason I would like to mention in this editorial what is the aim of this project and what outputs of this project will be important for informatics teachers and how the changes will be reflected in their practice.

The PRIM project aims to innovate the content of the educational area of Informatics and ICT by accentuating education aimed at developing the students' IT thinking. The project assumes the creation and pilot verification of comprehensive sets of teaching materials for all levels of schools, as well as a system of education of teachers teaching informatics in undergraduate education and in practice. At the same time, it will popularize topics related to information thinking, such as programming, understanding of information, robotics.

Main objectives of the project:

- to create a complex of interconnected educational materials (especially methodological materials for teachers) for all age groups,
- to build a system of training of teachers of the subject "Informatics" for all levels of schools,
- elaborate a unified system of training of future teachers at all faculties of education, which includes subjects of professional and didactic training of teachers,
- to reach the public with popularization campaigns that should attract attention and tune the company more favorably to IT professions and significantly influence the change of the company's negative attitude towards technical professions.

The project is implemented as part of the Operational Program Research, Development and Education and is co-operated by all faculties of education in the Czech Republic.



Project logo

One of the partial outputs of the project is to create a set of textbooks in computer science for students of primary and secondary schools. For inspiration, you can find the textbooks at: https://www.imysleni.cz/ucebnice

Currently, textbooks are being tested at selected schools in the Czech Republic and are continually updated and improved according to the comments of teachers who test the textbooks in practical lessons. The final textbooks will be available to teachers for the 2020/2021 school year

Tomas Javorcik

Executive Editor

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DEVELOPMENT AND AVAILABILITY OF LATEST ICT AND MOBILE TECHNOLOGY: A DIFFERENTIAL ANALYSIS

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ABSTRACT

The present study aims to investigate the students' views towards the Development and Availability (DA) of latest Information and Communication Technology (ICT) and Mobile Technology (MT) in Hungarian and Indian universities. This paper differentiates the students' perceptions regarding ICT and MT in their academic life in relation to residence country. To test our two null hypotheses to find a statistically significant difference between means of students' responses Student t-test and Mann-Whitney U test is applied at 0.05 significant level. Total of 331 primary samples was tested to find a significant difference in IBM SPSS Statistic 20. The Cronbach's Alpha value of DA with 16 variables was calculated as 0.72. On the one hand, the results of study reveal that there is significant difference in DA of ICT and MT resources such as Internet, Automated student attendance system, Student response system, Smart classroom, email addresses, Virtual learning environment, online centralized student information system, E-Reader, E-library and workshop / seminar Policies, and other hand, country did not affect the Smart Computer laboratories, Digital devices, Computers & laptops and Social network policies. Also, we found maximum DA (98%) for Desktop Computers equipped with internet access and connected with Network and minimum DA (10%) in Virtual learning environment in an Indian University. In Hungarian University, maximum DA (97%) is found in the online centralized student information system and minimum DA (22%) in E-reading devices.

KEYWORDS

Descriptive Analysis, Student Perception, Development and Availability of ICT, Mobile Technology.

1 INTRODUCTION AND RELATED WORK

Now a day, the integration of latest Information and Communication Technology and Mobile Technology is in trends. The strength of ICT & MT assists students in learning and to improve teaching skills of educators. The application of trendy technology as a tool is mandatory for enhancing learning power of both students and boost up teaching strength of teachers. By keeping this in view, we performed both descriptive and hypothetical study on primary samples. Due to preliminary study, to differentiate the latest development and availability of ICT and MT, we have mentioned the latest related literature.

University affiliation did not affect the teachers' attitude towards ICT in higher education (Verma C., Stoffová V., & I. Zoltán., 2018) and also, university affiliation status has no impact on perception of

students (Verma C., Stoffová V., & I. Zoltán., 2018). The gender variable did not impact on the opinions of students and faculty towards information and communication awareness (Verma C., & Dahiya S., 2016). A significant difference has been found between government and private secondary school teachers towards teaching attitude about ICT (Shah S. & Thoker A., 2013) and also a major difference has been discovered in the attitude towards using ICT in teaching between the types of institutions (Thakur G., 2014). The scatteredness in the mind-set of students and faculty towards ICT knowledge has been found (Verma C., 2018). No statistically significant difference has been found in the social outlook, personal outlook and academic outlook towards internet awareness regarding usage of Internet in relation to their field or expertise (Verma C., & Dahiya S., 2016). A meaningful difference has been found between opinion of students and educators for their occupation (Verma C., 2016). There is no consequential diversity has been found in between student and faculty towards Information and communication technology awareness in relation to their state of residence (Verma C., Kumar D., & Dahiya S., 2016). A study has been performed to explore the ICT knowledge difference between students and faculty in relation to their occupation (Verma C., & Dahiya S., 2016). T-test proves that educational standard and demography of students did not affect the outlook towards ICT awareness in higher education in relation to locality and level of study (Verma C., Dahiya S. & Sharma Y., 2016).

T test is a popular statistical hypothesis test used to compare the statistical mean of samples and it is also referred as the "Student T-test" (Verma C., Stoffová V., & I. Zoltán., 2018). The Mann-Whitney U test (nonparametric) can be used to compare differences between two independent groups when the dependent variable is either ordinal or continuous, independent variable should consist of two categorical.

On hand, T-test is also playing a vital role to test hypothesis on normally distributed data having more than 30 observations. On the other hand, Mann-Whitney U test is also substitute of T-test when data is not normally distributed. To perform differential analysis, the authors applied both T-test and Mann-Whitney U which are appropriate. Following is the equation of Mann-Whitney U:

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum_{i=n_1+1}^{n_2} R_i \quad (1)$$

Where:

U = Mann-Whitney U test criterion
n_1 = Sample size one
n_2 = Sample size two
R_i = Rank of the sample size

2 OBJECTIVE AND HYPOTHESIS

To explore significant difference in the development and availability of latest ICT and MT in between Indian and Hungarian universities, we framed following hypothesis to accomplish the main goal of study.
H_0: There is no significant difference in between the development and availability of ICT and MT in Hungarian and Indian University.

H_A: There is a significant difference in between the development and availability of ICT and MT in Hungarian and Indian University.

3 RESEARCH DESIGN AND METHODOLOGY

3.1 SAMPLING, VARIABLES AND DATA COLLECTION

A stratified random sampling was used to collect primary data from Indian and Hungarian University using Google form and through direct discussions. To gather data samples, a structured questionnaire was designed. The questionnaire was divided into five parts: the first one is demographic and the other four belong to ICT parameters represented by attitude (6 variables), development-availability (16 variables), educational benefits (9 variables) and usability (6 variables). A mixed approach to data scaling is applied such as nominal, binary, ordinal etc. In present study we considered only development-availability parameter having 16 variables belong to numerous questions. For this we kept the respond scale as 1-yes (DA), 2- No (NDA), 3-Do not know (UDA). These questions were decided after discussion and debate with domain expert. We have considered DA (16 variables) as dependent variable in Table 1 and Country (Indian University and Hungarian University) as an independent variable.

Table 1 Variables belong to the Development and Availability in Questionnaire

VAR-CODE	DESCRIPTION
DA1	Does your university have high speed Internet with wi-fi?.
DA2	Is your university using Automated student attendance system (e.g. Creatrix Campus)?
DA3	Is your university using student response system (e.g., ActiVote, ActivExpression or other)?
DA4	Does your university have smart classroom?
DA5	Does your university provide official email addresses to you?
DA6	Does your university have a virtual learning environment such as Moodle, Coggno?
DA7	Is there any policy in your university to conduct workshop/ seminar to learn latest ICT tools/techniques?
DA8	Does your university have policy to use social network like face-book, twitter etc.?
DA9	Is there any online centralized student information system (e.g. Neptune, others) in your university?
DA10	Are university's desktop Computers equipped with internet access and connected with Network?
DA11	Are there Internet-connected laptops, tablet PCs, netbooks or notebooks computer in your university?
DA12	Is there E-Reader (a device to read books and newspapers on screen) in your university?
DA13	Are your university using smart Computer laboratories?
DA14	Does your university have digital devices e.g. photocopy, scanner, printers, digital camera or camcorder, projector, etc.?ces
DA15	Is your university has E-library?

DA16	Is your university using latest and licensed software?

Figure 1 shows that the out of 331 students, 162 students belong to the Eötvös Loránd University of Hungary and 169 students belong to the Chandigarh University of India. Usually, the students spent approximately 15-20 minutes to complete the survey forms.

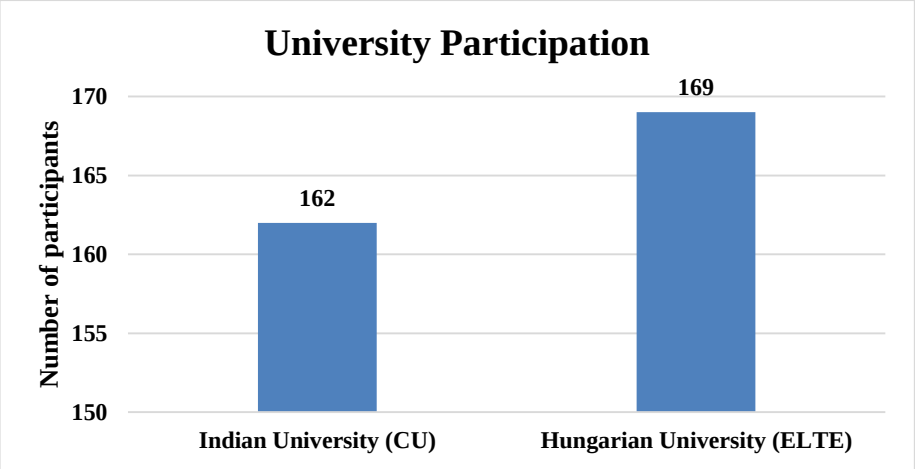


Figure 1 Participated of Universities.

There were also no queries raised from the students. The internal consistency of dataset has been tested using Cronbach's Alpha test and we found significant value 0.72 for conducting experiment.

3.2 RESEARCH TOOL AND TECHNIQUES

To determine the significant difference between two countries, independent sample Student t–test and Mann-Whitney U test was applied. In present study we have analysed the student's filled score in Microsoft Ms-Excel 2016 with extra Add-ins named Analysis Toolpack-VBA. T-test with equal variance was applied at 0.05 level of significance. IBM SPSS Statistic is also used to apply Mann-Whitney U test on dataset.

4 RESULTS AND DISCUSSION

4.1 DIFFERENTIAL ANALAYSIS

This section elaborates the results calculated by T-test and Mann-Whitney U test on samples at 0.05 significant level using SPSS tool.

Table 2 Indo- Hungarian University Difference in Development and Availability of ICT and MT

VAR	Name	T-Test		Mann-Whitney U Test	
		t	***p***	***z***	***p***
DA1	High speed Internet with Wi-Fi.	5.1	0.000	5.7	0.000
DA2	Automated student attendance system	3.6	0.000	3.1	0.002
DA3	Student Response System	7.0	0.000	6.3	0.000

DA4	Smart classroom	5.1	0.000	4.4	0.000
DA5	Official email addresses	5.0	0.000	5.4	0.000
DA6	Virtual learning environment	9.5	0.000	9.5	0.000
DA7	ICT workshop/ seminar Policy	8.9	0.000	7.6	0.000
DA8	Social network Policy	1.6	0.107	1.2	0.206
DA9	Online centralized student information system	6.9	0.000	7.3	0.000
DA10	Desktop Computers equipped with internet access	1.4	0.151	1.3	0.179
DA11	Laptops, tablet PCs, netbooks or notebook computers	1.4	0.137	1.1	0.258
DA12	E-Reader	5.6	0.000	5.3	0.000
DA13	Smart Computer Labs	1.6	0.095	0.7	0.473
DA14	Digital Devices	0.10	0.323	0.2	0.843
DA15	E-library	6.2	0.000	5.7	0.000
DA16	Latest and licensed software	2.5	0.011	3.3	0.001

Table 2 reveals that the statistical results calculated using T-test with unequal variance and Mann-Whitney U test at 0.05 significant level. According to both tests we found the almost identical results. For 11 variables DA1-DA7, DA9, DA12, DA15 and DA16 we found significant *p*-value ($p<.05$). Further, we also found *t* and *z* values significantly for these variables. Therefore, our null hypothesis H_0 is rejected and alternate hypothesis H_A is accepted for these variables. It is revealed that the development and availability of ICT and MT in Indian university is significantly differ from the development and availability in Hungarian university. For rest of 5 variables such as DA8, DA10, DA11, DA13 and DA14, the *p*-value is found insignificant ($p>.05$) which proves no significant difference in between the development and availability of ICT and MT in Indian university and Hungarian university. Hence, our null hypothesis H_0 is accepted and alternate hypothesis H_A is rejected for these 5 variables. It is also concluded that grouping variable country did not affect the development and availability of ICT and MT in both countries.

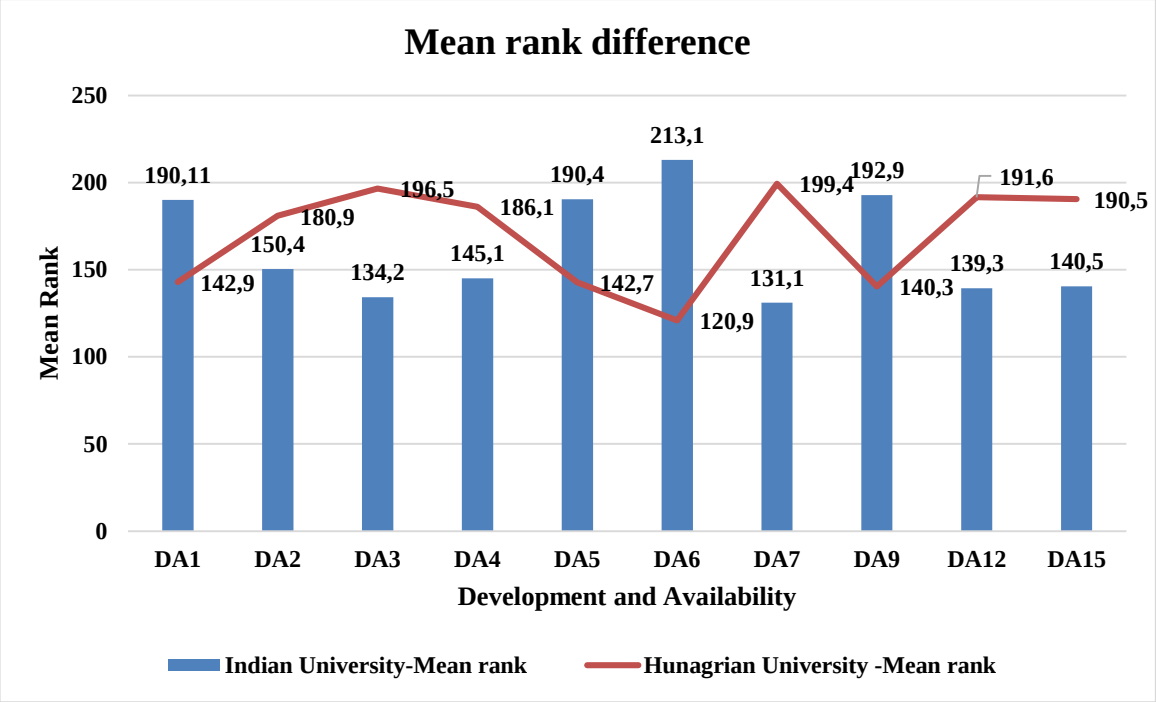
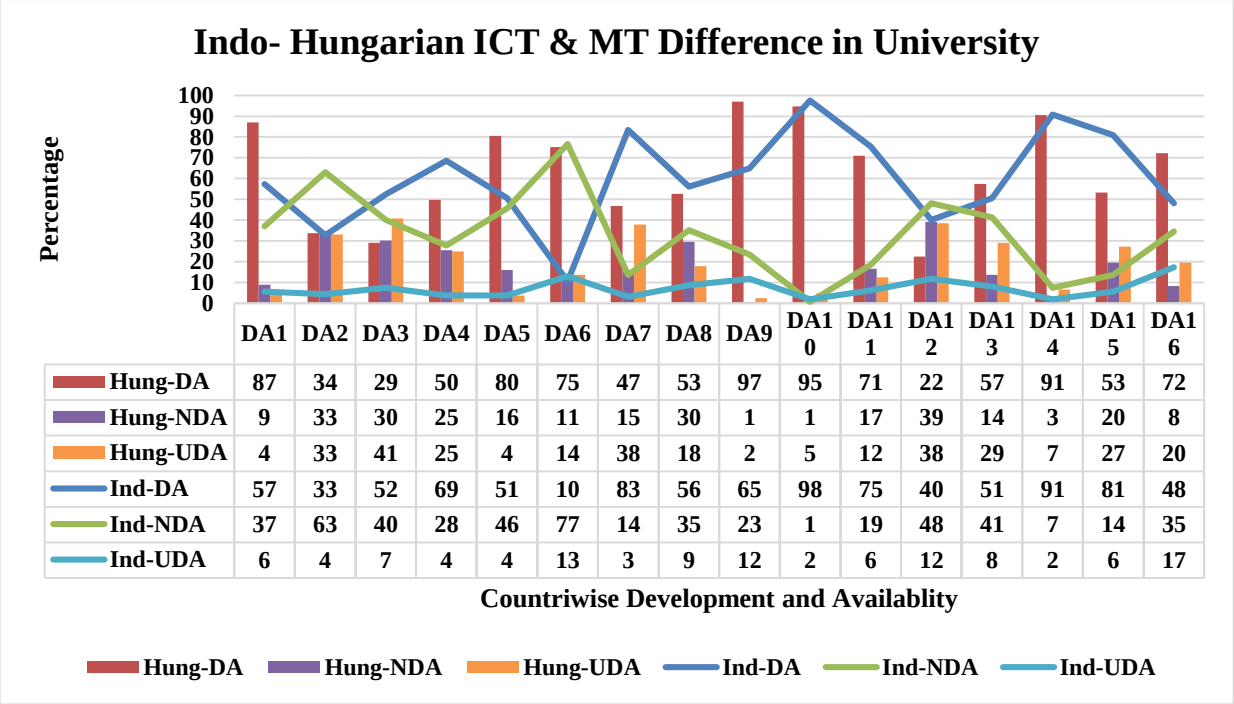


Figure 2 Mean Rank Difference using Mann-Whitney U test.

Figure 2 shows graphical view of Mean rank difference of seven variables in between Indian and Hungarian University. The highest mean rank of four variables DA1, DA5, DA6 and DA9 for Indian University proves a significant difference between two universities towards the development and availability of ICT and MT in higher education.

4.2 DESCRIPTIVE ANALAYSIS

In order to investigate the huge numbers of samples, a descriptive statistical approach is appropriate. In a nutshell, descriptive statistics aim to express a large chunk of data with abstract graph, charts and tables about the population from which the sample was taken. This section explains percentage analysis of the DA of ICT and MT in both country's University. The results are shown in Figure 3 in which x-axis presents 6 parameters such as Hungarian DA, Indian DA, Hungarian NDA, Indian NDA, Hungarian UDA, Indian UDA. Y-axis shows the percentage of these 6 parameters.



	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	DA9	DA10	DA11	DA12	DA13	DA14	DA15	DA16
Hung-DA	87	34	29	50	80	75	47	53	97	95	71	22	57	91	53	72
Hung-NDA	9	33	30	25	16	11	15	30	1	1	17	39	14	3	20	8
Hung-UDA	4	33	41	25	4	14	38	18	2	5	12	38	29	7	27	20
Ind-DA	57	33	52	69	51	10	83	56	65	98	75	40	51	91	81	48
Ind-NDA	37	63	40	28	46	77	14	35	23	1	19	48	41	7	14	35
Ind-UDA	6	4	7	4	4	13	3	9	12	2	6	12	8	2	6	17

Figure 3 Indo-Hungarian ICT & MT difference in DA.

Figure 3 shows the responses analysis graph of two countries. On the one hand, in Indian University, the maximum DA of Desktop Computers equipped with internet access (DA10) is found 98% and minimum DA of Virtual learning environment (DA6) is found 10%. Other hand, the maximum DA of Online centralized student information system (DA9) is found 97% and minimum DA of E-reader (DA12) is found 10% in Hungarian University. Also, more than 70% DA (DA7, D11 and DA15) is found for the ICT workshop/ seminar Policy, Laptops, tablet PCs, netbooks or notebook computers and E-library in Indian University. In Hungarian University, we found more than 70% DA in Virtual learning environment, Desktop Computers equipped with internet access, Laptops, tablet PCs, netbooks or notebook computers and Latest licensed software (DA6, DA10, DA11 and DA16). It is concluded that students are much aware about these Variables. Further, results reveals that Indian University has less development in the Virtual learning environment and there is need to focusing on E-reader development in Hungarian University. On the one hand, 41% students do not know (UDA) about the Student Response System (DA3) in Hungarian University and other hand, 17% do not know (UDA) about the licensed software (DA16) in Indian University.

CONCLUSION

In this paper, the authors investigated the current scenario of ICT and MT development and availability in Indian and Hungarian University. It is concluded that the DA of ICT and MT in Indian university is significantly differ from the DA of ICT and MT in Hungarian university for variables High speed Internet with Wi-Fi, Automated student attendance system, Student Response System, Smart classroom, Official email addresses, Virtual learning environment and ICT workshop / seminar Policy. Also, country variable make impact on the DA of ICT and MT in Indian and Hungarian universities towards Online centralized student information system, E-Reader, E-library and licensed software. On the one hand authors found that the maximum DA of Desktop Computers equipped with internet access is 98% and minimum DA of Virtual learning environment is 10% in Indian University. Other hand, the maximum DA of Online centralized student information system is found 97% and minimum DA of E-reader is found 10% in Hungarian University. The present study suggested to Indian university to integrate Virtual learning environment in education. Also, E-reading services should be also providing to the students in Hungarian University.

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LMS MOODLE BENEFITS REFLECTED BY STUDENTS' PERFORMANCE IN BLENDED LEARNING COURSE

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ABSTRACT

The use of technologies has its place in modern education, particularly language education, at any given level. The general tendencies towards the widespread use of technologies in education are needed but not sufficient if exclusively based on their motivational aspect. In modern society, there is a strong need to use technologies wisely and purposefully, exploiting their benefits in order to enhance educational processes. The very perspective and purposeful way of integrating technologies in education is the use of various Learning Management Systems (LMSs). Nowadays, the LMS Moodle is used by many schools and universities. The main focus of this study is to bring the results of the analysis of the impact of the LMS on students' performance in a blended learning type of English Lexicology course taught at Constantine the Philosopher University in Nitra, Slovakia and created in the LMS Moodle environment. The present study aims to bring a valuable insight into the use of the potentials that the LMS Moodle provides for blended language education.

KEYWORDS

CALL (Computer Assisted Language Learning), LMS (Learning Management System), Moodle (Modular Object-Oriented Dynamic Learning Environment), English Lexicology, Blended Learning.

1 INTRODUCTION

There are various types of software that enable the implementation of Computer Assisted Language Learning (CALL) within the educational process. According to Burgerová and Adamkovičová (2014), the most popular types of software are diverse LMSs (Learning Management Systems). The authors investigated Slovak universities in order to find out the most popular and the most frequently used LMS. It was found that most Slovak universities use LMS Moodle. Cimermanová (2013) conducted a survey among Slovak University teachers using LMS Moodle and found out that the system was positively evaluated because of its simplicity, user-friendliness as well as the fact it is open source software. LMS Moodle is also used at Constantine the Philosopher University in Nitra, Slovakia, where the research presented in this paper was conducted.

The current version of LMS Moodle can be characterised as follows (moodle.org, n.d., n.p.).:

"The heart of Moodle is a set of courses that contain activities and resources. There are about 20 different types of activities available (forums, glossaries, wikis, assignments, quizzes, choices (polls), SCORM players, databases etc.) and each can be customised in numerous ways. The main power of this activity-based model comes when combining activities into sequences and groups, which can

> *help guide participants through learning paths. Thus, each activity can build on the outcomes of the previous ones. There are a number of other tools that make it easier to build communities of learners including blogs, messaging, participant lists etc., as well as useful tools like grading, reports, integration with other systems and so on."*

The most important fact is that the philosophy of LMS Moodle is based on constructivism, social constructivism, and connectivism which means that it is a suitable technologically-based platform for ubiquitous CALL (*c.f.* Veselá, 2012).

This study proves that using the potentials of LMS Moodle in a blended learning language course has a positive impact on students' performance.

2 RESEARCH PART

2.1 Research Aim

The research was aimed at finding the relationship between exploiting the potentials of LMS Moodle for language education in a blended learning environment and the final study results of students.

2.2 Research Question

Is there a relationship between exploiting the potentials of LMS Moodle in the language course and study results of students?

2.3 Settings and Participants

The case study was conducted at the Department of Language Pedagogy and Intercultural Studies, Faculty of Education, Constantine the Philosopher University in Nitra, Slovakia in the winter semester of 2015/2016. The course lasted from 21.09.2015 to 19.12.2015 (13 weeks).

The participants of the study were 29 teacher trainees of English language and literature in their second year of study. The participants were divided into 2 groups within the English lexicology course. As for the organization of the English lexicology course, there was a lecture on Tuesdays from 13:00 to 14:40 and then 2 seminars took place each Tuesday. The first seminar started immediately after the lecture, i.e. 14:45-16:15 (18 students) and the second seminar lasted from 16:30 up to 18:00 (11 students). Both, lecture and seminar lasted for 90 minutes.

The course was led as a blended learning course, thus it consisted of a face-to-face phase and a CALL phase. Face-to-face lectures on English lexicology were not obligatory but were attended by most of the students. The seminars took place in a computer classroom, i.e. each student was able to use a computer with an active Internet connection; additionally, students were encouraged to use their own laptops when it had been more convenient for them, as there was a Wi-Fi connection available in the classroom. The attendance at seminars was compulsory, however, only approximately 30 minutes of the seminar were held as a traditional, contact lesson. The structure and phases of the seminar were more or less the same every week; i.e. each seminar started with a short discussion about the assignments from the previous seminar. The discussion about the current topic that was discussed during the lecture followed. Students were then given instructions about the new assignments in the LMS Moodle. After that phase, students had 2 opportunities: to work on the assignments in the classroom until the end of the seminar (the teacher was available there and ready to answer any questions, to guide and give advice), or to leave the classroom and work on the assignments anytime and anywhere they wished or had the opportunity to be. The submission deadline was every following Tuesday at 13:00.

2.4 Research Method

The study employed a comparative analysis of LMS Moodle records and results of students' performance.

2.5 Research Results and Interpretation

English lexicology was taught as a blended learning course, thus face-to-face interaction was accompanied by study on an online LMS Moodle course, which obviously should also support students' autonomous learning. In terms of the potential development of autonomy and independence, the focus was on determining if autonomous study with the help of the online course content had an impact on learner performance in the final examination.

Logs of all students under the study were downloaded, hits by each student during the term were counted and the relationship between the hits by the students and their score in the final exam was statistically processed via correlation analysis. To reach the most objective data, only the first attempts of the exam (out of three allowed) were taken into consideration, since the second and third attempts might have not been influenced by the blended character of their studies.

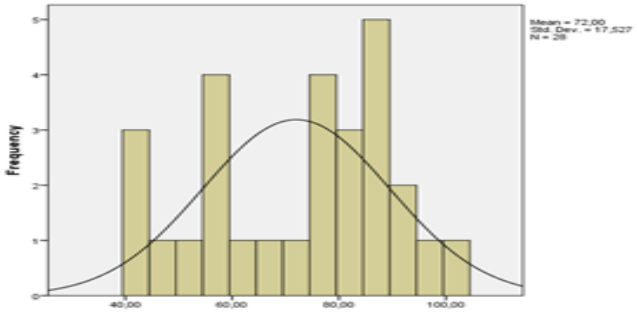
Table 1 below presents a descriptive set of statistics of the frequency of variables (i.e. final exam score in points of each individual student and number of hits by each of the students). Firstly, we aimed to ascertain the normality (symmetric distribution) of the dataset. The symmetric distribution of the dataset was investigated via the Skewness and Kurtosis methods. On the basis of these analyses it was found that the data is not symmetrically distributed since the Kurtosis in the variable "Final exam score in points" is beyond the set interval (i.e. from -1 to 1); more specifically the value of KU is -1.091.

Table 1 Descriptive statistics

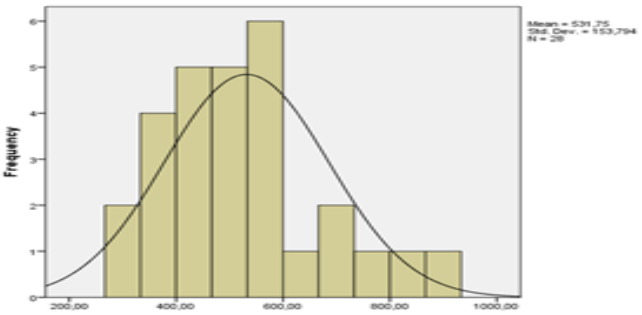
Factor	N	Min	Max	M	SEM	SD	SK	KU
Final exam score in points	28	42	95	71.82	3.31	17.53	-0.321	-1.091
Number of hits		293	906	531.75	29.06	153.79	0.849	0.425

*Note: N-number; Min-minimal score; Max-maximum score; M-mean; SEM-standard error of mean; SD-standard deviation; SK-skewness; KU-kurtosis

For better illustration, we also provide histograms (Graph 1 and Graph 2 below) which show us that the data in the sample does not fulfil the requirements of normal distribution of the dataset. Furthermore, from Table 1 below it can be seen that the sample does not fulfil the requirement of a minimum number of subjects in the research sample (which is 120). Consequently, these were the reasons why a parametric test in order to determine the correlation coefficient was not used; hence, the nonparametric test was employed.



Graph 1 A histogram of distribution of a dataset referring to the final exam



Graph 2 A histogram of distribution of a dataset referring frequency of hits by students

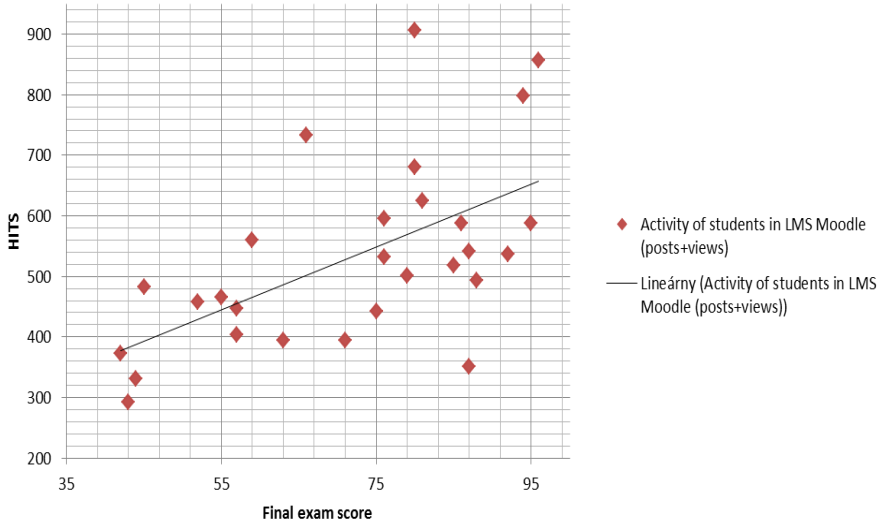
Table 2 below presents the final results of correlation analysis. In order to determine the relationship between the number of hits by students in the online course during the term and the final exam score, we used a Spearman's correlation coefficient nonparametric test. It can be seen from Table 2 that the value of Spearman rho is 0.613, which means that there is a strong correlation.

Table 2 Correlation Analysis

Factor	**N**	**M**	**SEM**	**SD**	**r**
Final exam score in points	28	71.82	3.31	17.53	**0.613**
Number of hits		531.75	29.06	153.79	

*__Note:__ **N**-number; **M**-mean; **SEM**-standard error of mean; **SD**-standard deviation; **r**-Spearman's correlation coefficient

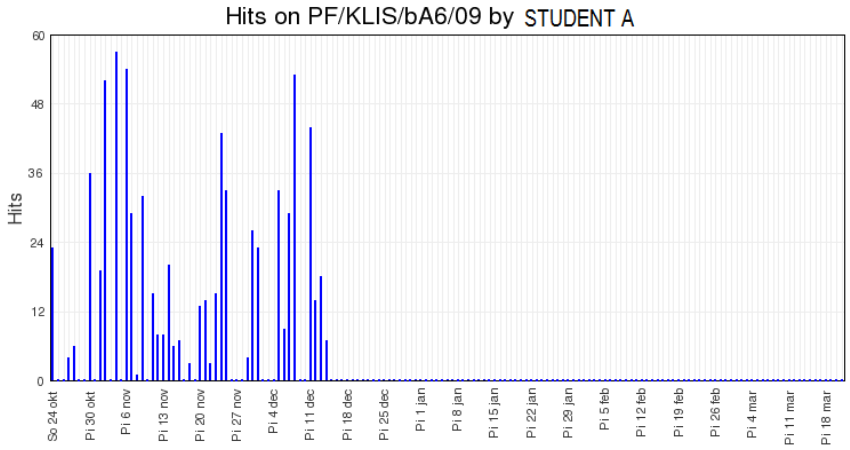
For better illustration, we provide Graph 3, which distinctly demonstrates the correlation analysis. Thus, it may be concluded that within the limitations of the present case study, there is a statistically strong relationship between the number of hits by students (i.e. both, views and posts) and the final test score. Therefore it can be stated that the correlation results proved that students who worked with the study materials demonstrated better performance on the final examination than those who had not worked with the online course very often.



Graph 3 Final exam score in points of each individual student versus number of hits by each of the students

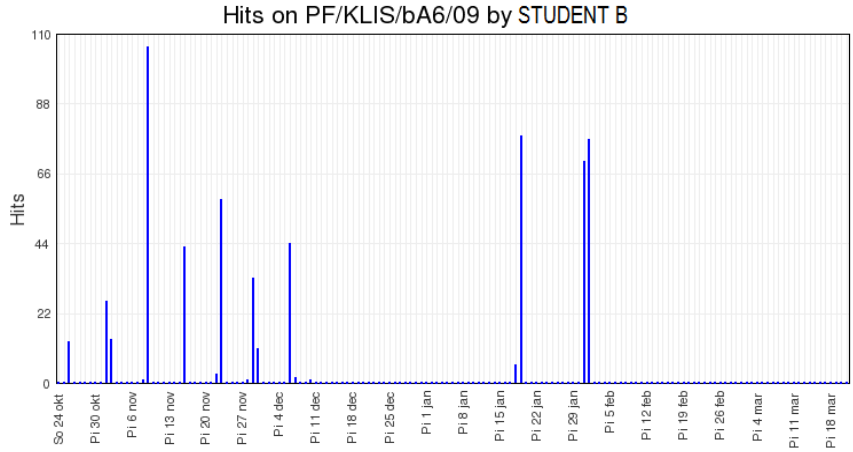
In order to support statistical results, a comparison of two students under the study is provided. Student A was one of the most active participants in the online course (as well as during the face-to-face phase of the course); i.e. the student with one of the highest number of hits (857 hits; i.e. 617 views, 240 posts) during the term. Furthermore, Student A reached the highest score in the final exam (96 out of 100 points). On the other hand, Student B is a student with both, the least number of hits (293; i.e. 100 views, 193 posts) during the term (up to 19.12.2015) and the lowest score in the final examination (43 out of 100 points).

To contrast the study performance of both Student A and Student B on the course, Graph 4 and Graph 5 are provided. Graph 4 is a statistical report about the hits by Student A in the course. It can be seen that Student A studied with the help of the online course very frequently, the highest number of recorded hits was 53 on November 3, 2015.



Graph 4 Logs of one of the most active participants of the course

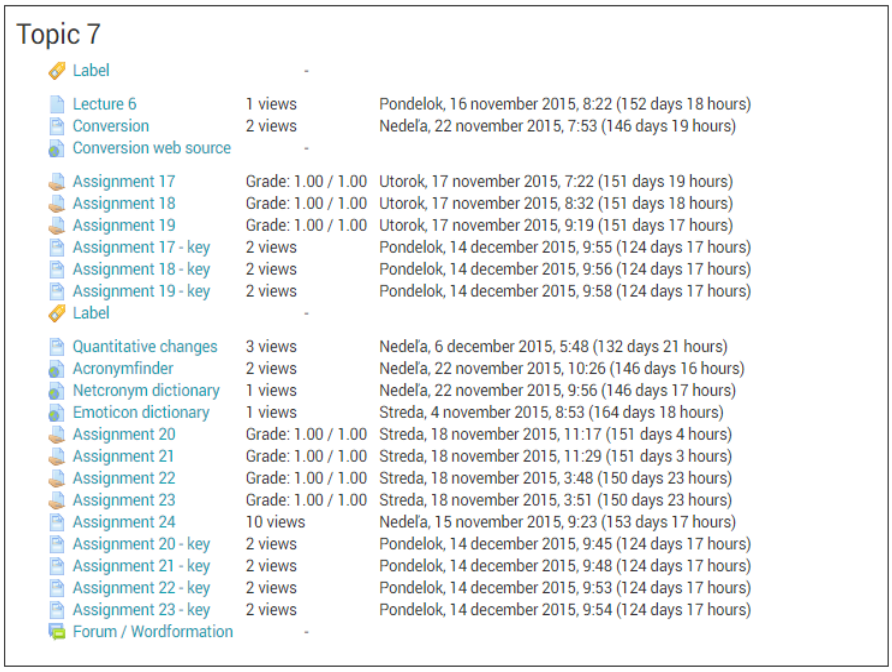
As far as Student B is concerned, it is evident from Graph 5 that this student did not use the content from the online course very often which mirrors his/her performance in the final examination. The high number of hits was recorded in January and February because Student B was most probably revising for the final exam (he/she did not pass the exam the first time on January 20, 2016, so he/she had to retake the exam on February 2, 2016).



Graph 5 Logs of one of the least active participants of the course

In addition, there is given a closer look at the study performance of Student A and Student B by showing the activity reports obtained from LMS Moodle. A random topic was chosen in order to show the differences between the study activities of both students more precisely.

Figure 1 shows an activity report of Student A within Topic 7. Within the entire Topic, there are only two sources without a view, i.e. URL: Conversion web resource and forum on Word formation. The "Labels" are not study materials as such, they serve to divide study contents and group them into thematically oriented units. Student A downloaded a Lecture file one day before the lecture actually took place, i.e. on Monday evening. It most probably means that Student A was interested in the new topic and wanted to see the content beforehand.



Topic 7

Label	-	
Lecture 6	1 views	Pondelok, 16 november 2015, 8:22 (152 days 18 hours)
Conversion	2 views	Nedeľa, 22 november 2015, 7:53 (146 days 19 hours)
Conversion web source	-	
Assignment 17	Grade: 1.00 / 1.00	Utorok, 17 november 2015, 7:22 (151 days 19 hours)
Assignment 18	Grade: 1.00 / 1.00	Utorok, 17 november 2015, 8:32 (151 days 18 hours)
Assignment 19	Grade: 1.00 / 1.00	Utorok, 17 november 2015, 9:19 (151 days 17 hours)
Assignment 17 - key	2 views	Pondelok, 14 december 2015, 9:55 (124 days 17 hours)
Assignment 18 - key	2 views	Pondelok, 14 december 2015, 9:56 (124 days 17 hours)
Assignment 19 - key	2 views	Pondelok, 14 december 2015, 9:58 (124 days 17 hours)
Label	-	
Quantitative changes	3 views	Nedeľa, 6 december 2015, 5:48 (132 days 21 hours)
Acronymfinder	2 views	Nedeľa, 22 november 2015, 10:26 (146 days 16 hours)
Netcronym dictionary	1 views	Nedeľa, 22 november 2015, 9:56 (146 days 17 hours)
Emoticon dictionary	1 views	Streda, 4 november 2015, 8:53 (164 days 18 hours)
Assignment 20	Grade: 1.00 / 1.00	Streda, 18 november 2015, 11:17 (151 days 4 hours)
Assignment 21	Grade: 1.00 / 1.00	Streda, 18 november 2015, 11:29 (151 days 3 hours)
Assignment 22	Grade: 1.00 / 1.00	Streda, 18 november 2015, 3:48 (150 days 23 hours)
Assignment 23	Grade: 1.00 / 1.00	Streda, 18 november 2015, 3:51 (150 days 23 hours)
Assignment 24	10 views	Nedeľa, 15 november 2015, 9:23 (153 days 17 hours)
Assignment 20 - key	2 views	Pondelok, 14 december 2015, 9:45 (124 days 17 hours)
Assignment 21 - key	2 views	Pondelok, 14 december 2015, 9:48 (124 days 17 hours)
Assignment 22 - key	2 views	Pondelok, 14 december 2015, 9:53 (124 days 17 hours)
Assignment 23 - key	2 views	Pondelok, 14 december 2015, 9:54 (124 days 17 hours)
Forum / Wordformation	-	

Figure 1 Activity report of Student A within randomly chosen Topic
*Note: Pondelok=Monday; Nedeľa=Sunday; Utorok=Tuesday; Streda=Wednesday

Student B's activity within the same Topic 7 is demonstrated in Fig. 2 below. As for the "obligatory" study resources, i.e. resources necessary to do the assignments, Student B accessed a Lecture file only; the other two necessary resources, i.e. Pages (Conversion and Quantitative changes) remained without any access by the student; however, he/she accessed the Lecture on January 20, 2016, i.e. before his/her first attempt of the final examination. It is not clear how Student A did the Assignments since he/she never accessed the lecture file during the week in which he/she was submitting the assignments. He/she might either have copied the entire set of assignments from classmates or searched out the information on the Internet. Moreover, Student B did not submit Assignment 20; however, there are more views of each of the assignment keys by Student B. We downloaded the logs of the observed student and we found that Student B accessed all of the Assignment keys before the final exam attempts only, hence he/she never viewed an Assignment key after it was opened to check if the submitted Assignments were correct. Student B also never accessed "extra" authentic resources; neither had he/she viewed a discussion forum in Topic 7.

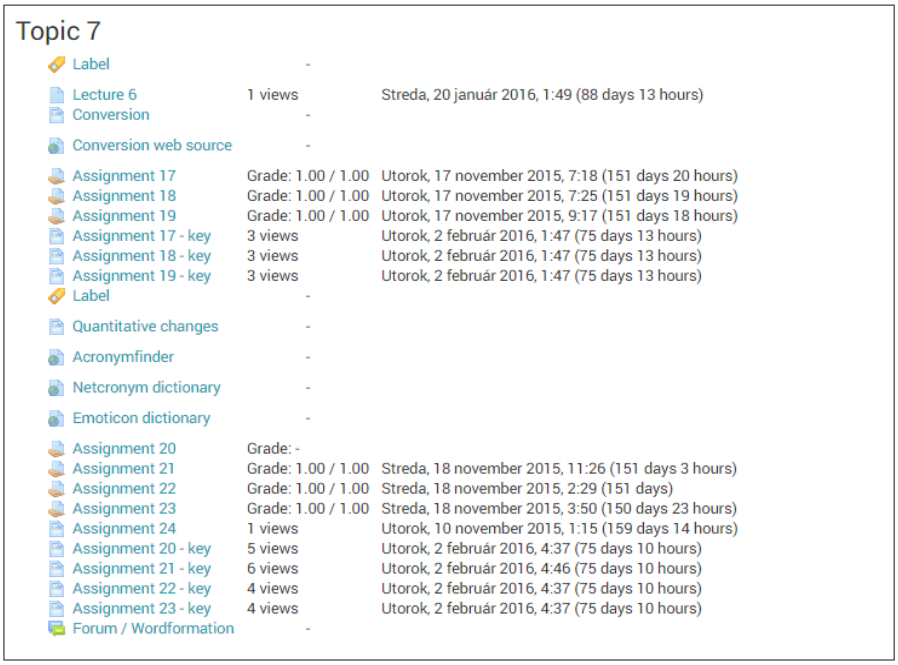


Figure 2 Activity report of Student B within randomly chosen Topic
*Note: Utorok=Tuesday; Streda=Wednesday

It may be concluded that the activity of Students A and B in the online part of the blended learning course on English lexicology was mirrored at the final examination. It is important to state that Student A is an excellent student who reaches high scores in all subjects which means that he/she is a highly motivated student. On the other hand, Student B is a student who frequently does not attend courses and his/her score is rather low. These are also important factors when predicting student performance, however, the statistical results proved that the more frequent the activity on the online course, the higher the final exam score.

To sum up, it can be claimed that frequent autonomous learning with the help of the e-learning course content has a positive impact on the study performance of students within the case study. This final assumption reflects and supports the ambition to help those who want to know more.

3 DISCUSSION

Since 1998, the year when Warschauer and Healey wrote their study on the merits of CALL, technologies have radically changed. However, it can be claimed that the technologies have not lost any of the beneficial aspects of CALL described by the authors; moreover, many new potentials have occurred since then. Nearly ten years later, Cabrini (2007) claimed that teachers at that time had the opportunity to gain students' attention by using sounds, different types of letters, images, etc., which is more effective since it helps the learners of a language to visualize the content. We are convinced that this potential is still of particular importance and is still present in understanding of CALL nowadays.

As for the more recent studies, in line with Riasati, Allahyar and Tan (2012), who analysed a number of studies concerned with the issue of technology in language education, it was proven that our blended CALL model supported both the learner-centred approach and collaborative learning. Moreover, the authors perceive an assessment shift (i.e. 21st century learning highlights the development of learners' autonomy) as a beneficial aspect of CALL. Such a development is to also be achieved by the overall assessment shift from teacher to self and peer evaluation. It can be claimed that within the English Lexicology blended CALL course, students were encouraged to self-assess themselves.

As a matter of fact, Cabrini (2007), Riasati, Allahyar and Tan (2012), AbuSeileek, and Abu Sa'aleek, (2012), and Bani Hani (2014) stressed that the big pitfalls of CALL are technological problems and availability of computer hardware and software. Moreover, these authors claim that the nature of the

Internet as a form of new technology is an obstacle itself. This is connected with technical problems, such as connectivity or limited access, etc. Taking the limitations of the case study into consideration, it can be assumed that this obstacle is not a big problem nowadays. Rapid development of technologies make them more and more reliable and as stated, students mostly submitted assignments on time, and from the results of the analysis of quantitative LMS Moodle records it was obvious that students in our research were able to access the internet and technological device any time they needed.

A very important benefit defined by Bani Hani (2014) and Han (2008, cited in Tafazoli and Golshan, 2014) is learners can use CALL content inside as well as outside the classroom which was highly appreciated by our students, who often emphasized that the combination of face-to-face and CALL phases, which could have been performed anywhere and anytime was the most proper solution for them, the fact proven by the research that the student who managed to exploit this benefit of blended learning better performed in the final exam than the student who failed to use this potential.

We agree with Blieck et al. (2019) that pedagogy behind the blended learning courses is highly important, therefore students should be encouraged to be active to yield as much profit from this type of learning environment as possible.

CONCLUSION

Analysis of the quantitative LMS Moodle records provided the results of the students' activities on the course from an objective point of view. It was found that the students in the study used the enormous potential of flexibility and were actually studying even late into the night or early morning hours as well as during the weekends and holidays. It was also proved that the more frequent the activity of the students on the online course, the higher their final exam score. It seems important here to stress the fact that the results from the case study cannot be generalized; however, it can be concluded that frequent, autonomous, as well as collaborative technology-supported learning usually leads to better study performance.

Based on the research results and the theories about CALL, we dare to assume that the future of CALL would rather be a blended CALL approach, where a teacher-student pattern interaction is the base, which would be supplemented by studying with the help of the gradually developing technologies, performed at any place and time, benefitting from the enormous potential of technology's flexibility.

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SCATTEREDNESS TESTING OF THE ATTITUDE OF STUDENTS AND TEACHERS TOWARDS ICT

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ABSTRACT

In this paper, we have evaluated the scatteredness in the attitude of Indian students and teachers towards Information and Communication Technology (ICT) in University level. The survey was held in the academic year 2015-2016 in six Indian universities. Out of 904, the count of student's samples was 560 and teacher's samples was 344. We applied Frequency test (F-test) at 0.05 significant level on two datasets. The present study considered 35 independent variables belongs to ICT awareness (Availability, Usability, Problem, Solution, Opportunity) and one dependent variable named residence state. The degree of freedom (DF) for Punjab-Haryana student is 282-278 and for Punjab-Haryana Teacher is 184-160. The findings of study reveal that there is scatteredness found in the attitude of students and teachers towards 20 independent variables. Also, we did not find scatteredness in the attitude of stakeholders towards 15 independent variables. Therefore, these 15 independent variables are making no significant effects on the attitude of students and teachers towards ICT in Indian higher education system.

KEYWORDS

F-test, Attitude, Teacher, Student, Residence State, Scatteredness.

1 INTRODUCTION

Information and Communication Technology (ICT) is the strength of higher educational institutions . In past two decade, India has achieved remarkable development in both sectors. Information technology industry in India consists of information technology enabled services (ITES), hardware production and software development. India is using rapidly ICT resources in research, projects and higher education (Verma C., 2016). Thee litratures of paper discussed study has been conducted on differnertail anlaysis of eductaiors's attitude, opinions, and ICT awarness in relaiton to various fetautres such as gender, loclaity, occupation and others having statstcal tests. University affiliation did not affect the teachers' attitude towards ICT in higher education (Verma C. et al., 2018) and also, university affiliation status has no impact on the perception of students (Verma C. et al., 2018). The gender variable did not impact on the opinions of students and faculty towards information and communication awareness (Verma C., & Dahiya S., 2016). A significant difference has been found between government and private secondary school teachers towards teaching attitude about ICT (Shah S. & Thoker A., 2013) and also a major difference has been discovered in the attitude towards using ICT in teaching between the types of institutions (Thakur G.,2014). The scatteredness in the mind-set of students and faculty towards ICT knowledge has been found (Verma C., 2018). No statistically significant difference has been found in the social outlook, personal outlook and academic outlook towards internet awareness regarding usage of Internet in relation to their field or

expertise (Verma C. & Dahiya S., 2016). There is meaningful difference has been found between the opinion of students and educators for their occupation (Verma C., 2016). There is no consequential diversity has been found in between student and faculty towards Information and communication technology awareness in relation to their state of residence (Verma C., Kumar D., & Dahiya S., 2016). A study has been performed to explore the ICT knowledge difference between students and faculty in relation to their occupation (Verma C. & Dahiya S.,2016). T-test proves that educational standard and demography of students did not affect the outlook towards ICT awareness in higher education in relation to locality and level of study (Verma C. et al., 2016). This paper is categorized into 3 major sections. Section 1 elaborates the research methods includes objectives, variables, sampling, instrument and tools & techniques applied. Section 2 discusses the results of the study and Section 3 concludes the outcomes of the study.

2 RSEARCH DESIGN AND METHODLOGY

Objective

This paper is written to analysis the scatteredness in attitude of teachers and students of Indian higher education towards ICT. Also, the authors investigated the significant difference among students and teachers in relation to their residence state towards ICT awareness.

Variables

Out of total seventy variables, only 50% variables are passed under Item analysis test. In the Item analysis test, 26 variables had VG status and no need for updating further as the Discriminating Power (DP) lies in between the range of 0.40-0.9. There were 9 variables were found with Good (G) status for DP 0.30-0.39, requires little bit modification; the 35 variables were found with Poor (P) status for DP<0.19. Hence, these variables were rejected due to difficulty value (DV) is less than 0.20 [cite]. Hence, this paper included the 35 five dependant variables and 4 independent variables to be analysed. The independent variables are named as Punjab Student, Haryana Student, Punjab Teacher and Haryana Teacher. Table 1 displays the name of 35 dependent variables used in study.

Sampling

A stratified random sampling was used to collect 904 samples from six Indian Universities. Total of 3 Universities were considered from each state for samples collection. For this, normative survey method was used to gather primary data belongs to teachers and students of Indian Higher education.

Instrument

After selection of variables and sampling methods, a well-defined structured questionnaire was designed to collect primary data samples. Therefore, 5 point Likert format questionnaire was used with of 35 dependent variables. Each item was self-reported scored on a 5 point Likert type scale (strongly disagree (SD) =1, disagree (D) =2, undecided (UD) =3, agree (A) =4, and strongly agree (SA) =5).

Response Rate

During survey, the total 344 teachers and 560 students have participated. Total of 269 students were belong to the government and 190 students were related to the private Universities. Total count of government teachers was 156 and private teachers was 188. Total 1000 survey forms were distributed to students and teachers and the researcher received back 904 only. Hence, Figure 1 shows the response rate of research which is calculated as 90.4%.

$$\frac{\#\text{Received}}{\#\text{ distributed}} \times 100 \leftrightarrow \frac{904}{1000} \times 100 = 90.4\%$$

Figure 2 Response Rate

Tools and Techniques

To evaluate the instrument and to explore scatteredness in the attitude of stakeholders, we used Frequency test at 0.05 significance level using Data analysis tool in MS- Excel 2016. A Statistical F Test has been used as an F Statistic to compare two variances of variables Punjab Student and Haryana Student; Punjab Teacher and Haryana Teacher , by dividing them. The equation for comparing two variances with the f-test is:

$$F = s^2_1 / s^2_2$$

Where S1 denotes largest variance and S2 denotes smallest variance in the series.

3 RESULTS AND DISCUSSIONS

This section explores the variance difference among students and Teacher towards ICT for their residence state. It also describes that scatteredness in responses of student and Teacher. To find out scatteredness in opinions of participants, F-test at 5% significant level for variances of 35 dependant variables. Table 8.9 reflects significant difference between variance of student and Teacher for their state. The degree of freedom (DF) for Punjab-Haryana student is 282-278 and for Punjab-Haryana Teacher is 184-160. Applying F-test at 5 % level, calculated F value (CF) is compared with observed (OF) for find significant difference in the variances of students and Teacher for their state. The observed F value (OF) for Punjab-Haryana student and Punjab-Haryana Teacher is 1.22 and 1.28 respectively.

Table 2 State Wise Variances Difference for Student-Teachers.

VAR No.	Independent Variables	Punjab-Haryana student $PS_{DF=}$ 282 $HS_{DF=}$ 278	Punjab-Haryana Teacher $PF_{DF=}$ 184 $HF_{DF=}$ 160
		Observed F-Value (O_F)=1.22	Observed F-Value (O_F)=1.28
		Calculated F-Value (C_F) at 5%	
1	Adequate ICT infrastructure is available.	1.51	1.48
2	Institution campus is WI-fi.	2.37	1.44
3	Sufficient bandwidth is available for Internet.	2.43	1.11
4	ICT tools/software are easy accessible.	1.11	1.52
5	Institutions have clear policy framework to integrate ICT	1.38	1.88
6	Sufficient funds are available to promote ICT based research and development.	1.15	1.65
7	Sufficient ICT tools/software and hardware are available in research laboratory.	1.13	1.27
8	Institutions have E-library.	0.95	1.05
9	Adequate E-journals/ E-contents are available in Library.	1.02	1.25
10	E-contents are easily accessible/subscribed in library	0.99	1.30
11	ICT used in Planning and Management.	0.73	1.56
12	ICT tools/software used in research and development are reliable.	1.25	1.16
13	Use of ICT encourages research and project development.	1.25	0.93
14	ICT is used to exchange the research information with other organizations.	1.39	1.32
15	ICT used adequately in teaching, learning and research activities.	1.12	1.32
16	E-journals/ E-contents effectively using in research and development.	0.98	1.56
17	ICT is used to access the E-contents from other libraries.	1.64	1.60
18	ICT is used to learn the lecture/lesson from other institutions experts through video conferencing.	1.27	1.45
19	Time consuming to integrate ICT into teaching, learning, research and development.	1.45	1.15
20	Lack of readiness to adopt ICT technology in Teaching and Learning.	1.36	1.31
21	ICT tools/software not user friendly due to lack of training.	1.07	1.01

22	Need to increase the latest ICT infrastructure.	1.39	1.07
23	Internet bandwidth should be increased.	1.87	1.46
24	Need to increase E-journals/ E-contents as per requirement	1.96	1.32
25	Need to enhance ICT in Teaching and Learning.	2.12	1.12
26	Need for training/workshop to learn ICT tools/software and equipment.	1.97	1.12
27	ICT increase the effective teaching and E-learning in classroom.	2.09	1.19
28	Students and Teachers feel more professional, motivate, confident while using ICT resources.	1.05	2.21
29	ICT provides more comprehensive material of a particular topic.	1.44	1.61
30	ICT plays an important role in Admission and Examination.	1.05	2.07
31	Integrate of ICT increase Placement activities.	1.08	1.23
32	ICT reduce the cost for information exchange	1.78	1.34
33	ICT helps in design to new projects in higher education.	0.98	0.97
34	Successful ICT integration will brighten the future of Higher education	0.80	0.98
35	Using the ICT available increases productivity in Higher Education.	1.30	1.32

(*O_F = Observed F Value, C_F=Calculated F Value, VAR=Variable, DF=Degree of Freedom, $PS_{DF=\ Punjab}$ Student DF, $HS_{DF=}$ Haryana Student DF, PF_{DF} = Punjab faculty DF, HF_{DF} = Haryana faculty DF. (Source: Authors)

In Table 1, to calculate the variances difference between Punjab and Haryana students, calculated F values (CF) for variables no. 1-3,5,12-14,17-20,22-27,29,32 and 35 are greater that observed F value (OF) which is 1.22 at 5 % significant level for Punjab student's DF =282 and Haryana students' DF=278 (CF>OF at 5% for PSDF =282 and HSDF =278). It is found significant at 5% level. Hence, there is significant difference between variances of students for their state. Hence, we found scatteredness in the opinions of Punjab students and Haryana students towards ICT for these 20 variables. At another side, it is found that the calculated F values (CF) for variables no. 4,6-11,15-16,21,28,30-31 and 33-34 are smaller than that observed F value 1.22 (OF) at 5% significant level for Punjab Teacher's DF =184 and Haryana Teacher's DF=160 (CF<OF at 5% for PSDF =282 and HSDF =278). It is not significant at 5% level. Hence, there is not a significant difference between variance of Punjab Teacher and Haryana Teacher for these 15 variables. Hence, it proves their opinions towards ICT are not significant scattered.

Table 1 explores the difference in between variances of Punjab-Haryana Teacher. The calculated F values (CF) for variables no. 1-2,4-6,10-11,14-18,20,23-24,28-30,32 and 35 are greater that observed F value (OF) which is 1.28 at 5% significant level for Punjab Teacher's DF = 184 and Haryana Teacher's DF= 160 (CF>OF at 5 % for PFDF = 184 and HFDF =160). It is found significant at 5% level. Hence, there is significant difference between variances of Punjab Teacher and Haryana Teacher. Therefore, we found scatteredness in their opinions towards ICT for these 20 variables. The calculated F values (CF) for variables no. 3,7,8-8,12-13,19,21-22,25-26,27,31 and 33-34 are smaller than that observed F value (OF) at the 5 % significant level for the same degree of freedom (CF<OF at 5 % for PFDF = 184 and HFDF =160). It is not significant at 5% level. Hence, there is not a significant difference between variance of Teacher of Punjab-Haryana towards ICT for these 15 variables.

CONCLUSION

The outcomes of the paper described state wise significant variance difference among students and teachers towards ICT awareness F-Test. The authors did find any scatteredness in the attitude of the students and the teachers for the accessibility of ICT tools/software, Sufficient funds, Sufficient ICT tools/software and hardware, E-library, available E-journals & E-contents and its use, ICT in Planning and Management, ICT in teaching-learning and research activities, ICT in admissions and exams, ICT in Job placement, lack of training, Motivated and professional feeling, ICT in projects, ICT brighten the future of Higher education. Also, state variable impacted the attitude of teachers and students towards ICT for 20 variables discussed in Table 1. This paper recommends the future availability, usability and opportunities of ICT for stakeholders of higher education of Indian Universities.

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