

# Student's Locality Impact on ICT and Mobile Technology for Real-Time

Chaman VERMA, ILLÉS Zoltán, STOFFOVÁ Veronika

**Abstract.** To evaluate the demography feature impact on students' minds to-wards the Information and Communication Technology (ICT) and Mobile Technology (MT) is a crucial challenge in the international study environment. The present paper explored the locality (rural and urban) impact on students' outlook regarding the technology parameters (attitude, utilization, development, and benefits). The authors applied a non-parametric test (Mann-Whitney U) on 37 features, and 302 samples were gathered from Hungarian and Indian universities. The results of the paper evidence that the locality of students did not impact the ICT and Mobile technology in Indian and Hungarian universities. The authors found that the Hungarian rural and urban students think differently about "High-speed internet with Wi-fi" ( $U=1205$ ,  $p<0.05$ ) but not in the case of Indian students.

**Keywords:** Impact, Student, Locality, Technology, University.

## 1. Introduction and related work

ICT and mobile technology have become an essential element in modern higher education. During the Covid-19 pandemic, the use of ICT and mobile technology has increased a lot. Of course, it supported both educators and students in continuing their teaching and learning processes. An exhaustive study is conducted to explore a digital divide among rural and urban students based on computers and their applications [1]. ICT is regarded as a catalyst for reducing education inequality between rural and urban regions [2]. Several researchers investigated the disparity between opinions of rural and urban students and teachers towards ICT, computational thinking, and other technology parameters. The rural teachers use rare interactive functions in presentations as compared to urban [2]. The students living in the capital have a high performance in problem-solving compared to students living in rural areas or weak areas [3]. Students' locality influenced their opinions towards ICT, and urban students found more positive than rural students [4]. A study explored disparity among students belongs to the mechanical focuses towards ICT attitude in Hungary. This study found only one significant variable out of 24 that focused on the requirement of ICT at faculty while selecting for the study [5]. A considerable disparity among students was also found based on locality towards internet utilization [6].

## 2. Objective and Hypotheses

The main objective of this paper is to explore the impact of locality on the opinions of students of Indian and Hungarian students towards technology. The below null hypotheses are framed:

H01: Locality has no significant effect on the opinions of Indian students towards technology

H02: Locality has no significant impact on the opinions of Hungarian students towards technology.

## 2. Dataset Description

This paper used a primary dataset collected from the students of Indian and Hungarian universities to compare the opinion towards technology. The name of the Hungarian university was Eötvös Loránd University, and the name of the Indian university was Chandigarh university. The

participants' students were studying in a computer science course. In the dataset, we have 37 variables and 337 instances. After the removal the outlier, we have 302 instances.

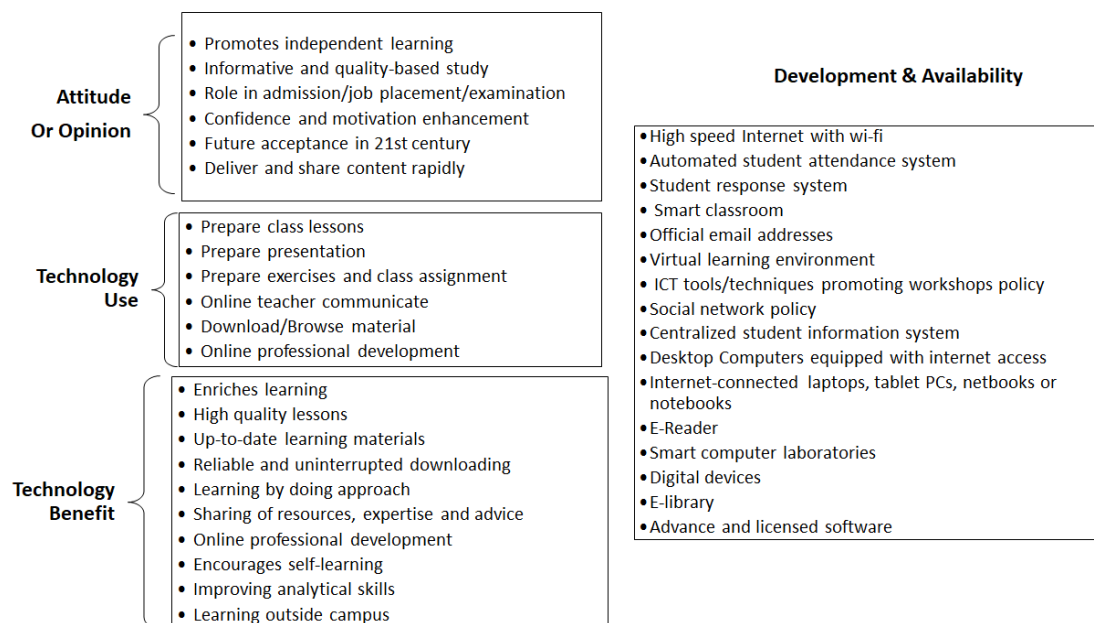


Figure. 1 Variables Under Investigation.

Figure 1 displays the shortened variables used for the analyses. We used 6 variables belong to students' attitude towards ICT, 6 variables related to technology use, 9 variables related to technology use, and 16 denote the development & availability of ICT. The reliability of the samples is 0.841 computed with Cronbach's alpha test. The sample adequacy is 0.89, estimated with the Kaiser-Meyer-Olkin measure, and this adequacy is stamped with Bartlett's test of sphericity ( $p < 0.05$ ).

#### 4. Experimental Results

The experiment is conducted in the IBM SPSS tool, and the non-parametric Mann–Whitney U test is used to compare the technology parameters. The group variable is the locality which has two groups rural and urban. Rural students live far from the city in remote areas, and urban students live in developed cities. In Indian samples, the ratio of rural and urban is 50:107, and the Hungarian rural and urban ratio is 24:121. A total of 37 test variables are passed through this Mann–Whitney U test at a 0.05 level of significance. Out of 37 variables, we found only one variable significant. It is applied to the abnormal samples to explore the locality impact on the technology of two countries. This test ignored the required assumptions of normality, unlike the t-test. The below equation is used to examine the effect of locality on the dependant variable.

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

Where, U = Mann-Whitney U test criterion,  $n_1$  = Indian sample size  $n_2$  = Hungarian sample size,  $R_i$  = Rank of the variable.

	Indian Student	Mean Rank	<i>p</i> -value	Hungarian Student	Mean Rank	<i>p</i> -value
High speed Internet with wi-fi	Rural	77.6	0.76	Rural	83.3	0.02
	Urban	79.7		Urban	71.0	

Table1: Locality Impact on Technology.

Table 1 shows the results of the Mann-Whitney U test applied group variable locality. The variable "High-speed Internet with wi-fi" was found significant for Hungarian students, unlike Indian students. Considered this variable for the Indian students, the null hypothesis "H01 : Locality has no significant impact on the opinions of Indian students towards technology" is failed to reject ( $p > 0.05$ ). For the Hungarian students, this null hypothesis, "H02 : Locality has no significant impact on the opinions of Hungarian students towards technology," is failed to accept ( $p < 0.05$ ). Therefore, the locality variable has significantly impacted the opinions of Hungarian students. But it did not affect the viewpoints of the Indian students.

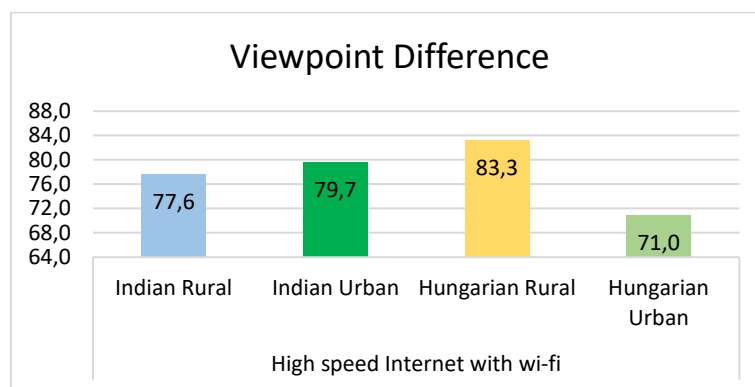


Figure. 2 Mean rank difference between Indian and Hungarian students.

Figure 2 graphs the difference between the opinions of urban and rural students of two countries towards variable "High-speed Internet with wi-fi". The rural students' mean rank is higher than the mean rank of urban students ( $83.3 > 71.0$ ). It means that there is a disparity in the thinking of Hungarian urban and rural students. But Indian urban and rural students have no significant difference towards this variable ( $77.6 \approx 79.7$ ).

#### 4. Conclusion

The present paper compared the opinions of computer science students of Indian and Hungarian universities. Only one variable, "High-speed Internet with wi-fi," is found significant out of 37 variables. The paper results signify that the Hungarian rural students' opinions are higher than those of urban students ( $83.3 > 71.0$ ). This means the rank difference is justified with a significant *p*-value ( $p < 0.05$ ). This outcome is opposite to existing results [4] but supportive of the findings [6]. Based on a substantial *p*-value, it is proved that the locality has impacted the opinions of Hungarian students. The results of the paper also concluded that there is no disparity in the viewpoints of Indian students ( $p > 0.05$ ). The findings of study suggested that the urban students at Hungarian university need to think more positively about the high-speed internet with wi-fi facility. Also, the university's administration and technical support can help boost their opinion about it by

eliminating obstacles, if any. The Mann-Whitney U test can be used to test the views of university real-time classroom response system “E-lection” [7] in lack of normal samples. Hence, we recommend this approach to assess the opinion of students.

## Acknowledgment

The work of Chaman Verma and Zolt'an Ill'es was supported under ``ÚNKP, MIT (Ministry of Innovation and Technology) and National Research, Development and Innovation (NRDI) Fund, Hungarian Government and Co-financed by the European Social Fund under the project: ``Talent Management in Autonomous Vehicle Control Technologies (EFOP--3.6.3--VEKOP--16--2017--00001)".

## Bibliography

1. Kumar, S.: *The Digital Divide among the Rural and Urban Students: An Exploration*. In South Asian Journal of Participative Development, 18(2), pp. 160–167. (2018).
2. Yang, N., Yang, H.H.: *Understanding Rural and Urban Teachers' ICT Usage in China: An Ecological Perspective*. In 2019 International Joint Conference on Information, Media and Engineering (IJCIME), Japan: IEEE (2019) pp. 498–501.  
[DOI:10.1109/IJCIME49369.2019.00106](https://doi.org/10.1109/IJCIME49369.2019.00106)
3. Nicolas, A.N., Guliana, C.M., Sandro, A.S.: *Comparing computational thinking skills of engineering students in urban and rural areas of Peru*. In 2020 IEEE ANDESCON, Ecuador: IEEE (2020) pp. 1–5. [DOI:10.1109/ANDESCON50619.2020.9272097](https://doi.org/10.1109/ANDESCON50619.2020.9272097)
4. Frederick, K.S., Alex, M.A., Kobina, I.A., Charles, B.: *Technology and gender equity: Rural and urban students' attitudes towards information and communication technology*. In Journal of Media and Communication Studies, 3(6), pp. 221–230. (2018).
5. Kiss, G., Kalagiakos, P.: *A comparison of the mechanical engineering and technical manager student's ICT attitudes at the Obuda University*. In 2014 Information Technology Based Higher Education and Training (ITHET), UK: IEEE (2014) pp. 1–5. [DOI: 10.1109/ITHET.2014.7155690](https://doi.org/10.1109/ITHET.2014.7155690)
6. Ünlü, Z.K., Dökme, I., Sarikaya, M.: *A comparison of the attitudes of rural and urban secondary school students towards the use of the internet*. In World Journal on Educational Technology, 6(2), pp. 192–202. (2014).
7. Bakonyi, V., Illés, Z., Verma, C.: *Analyzing the students' attitude towards a real-time classroom response system*. In 2020 International Conference on Intelligent Engineering and Management (ICIEM), U.K: IEEE (2020) pp. 69–73.  
[DOI:10.1109/ICIEM48762.2020.9160162](https://doi.org/10.1109/ICIEM48762.2020.9160162)

## Author

Chaman VERMA  
ELTE Eötvös Loránd University, Faculty of  
Informatics, Hungary  
e-mail: [chaman@inf.elte.hu](mailto:chaman@inf.elte.hu)

ILLÉS Zoltán  
ELTE Eötvös Loránd University, Faculty of  
Informatics, Hungary  
e-mail: [illes@inf.elte.hu](mailto:illes@inf.elte.hu)

STOFFOVÁ Veronika  
Trnava University, Slovakia  
e-mail: [veronika.stoffova@truni.sk](mailto:veronika.stoffova@truni.sk)

## About this document

### Published in:

CENTRAL-EUROPEAN JOURNAL OF  
NEW TECHNOLOGIES IN RESEARCH,  
EDUCATION AND PRACTICE

Volume 3, Number 3. 2021.

ISSN: 2676-9425 (online)

### DOI:

10.36427/CEJNTREP.3.3.2949

## License

Copyright © Chaman VERMA, ILLÉS Zoltán, STOFFOVÁ Veronika. 2021.

Licensee CENTRAL-EUROPEAN JOURNAL OF NEW TECHNOLOGIES IN RESEARCH, EDUCATION AND PRACTICE, Hungary. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license.

<http://creativecommons.org/licenses/by/4.0/>