

Statistical Analysis to Explore the Factors of ICT that Effect and Promote Global Citizenship among Undergraduate Students: A Case Study of Karachi

Shagufta Bibi^{1,*}, Zaira Wahab¹ and Afaq Ahmed Siddiqi²

¹Iqra University, Karachi, Pakistan

²Faculty of Pharmacy, University of Karachi, Karachi, Pakistan

Abstract: This study aimed to explore the underlying relation between ICT and the factors that promote global citizenship among university undergraduate of Karachi, Pakistan through quantitative method approach. Globalization has had numerous and multifaceted effects on education policies and practices at various levels. Therefore, this study attempted to highlight the significance of ICT uses as a tool for fostering global citizenship among undergrads of both sectors in Karachi. The impact of ICT on factors that promote global citizenship among university students are also examined. The Global Citizenship Survey questionnaire was used for quantitative data. A total of 400 students from private and public sector universities participated in this study. The reliability of the responses calculated through Cronbach's alpha and found to be almost 0.82 for all constructs. This indicates that responses are highly consistent within each construct. An advanced Multivariate Statistical tool " Exploratory Factor Analysis" (EFA) was also carried out to identify the hidden pattern of the data and identify the most important factors of ICT that promote global citizenship. For the adequacy of data that is the data are suitable for the factor analysis Kaiser Meyer Olkin (KMO) criteria was considered and its value is found to be 0.784. This value indicates that the Global citizenship survey data are adequate and good enough to carry out factor analysis. For the interpretation and discussion of the results we consider first 5 factors with eigen value greater than 1. The results of factor analysis indicate that factors with items of high positive loading are the communication skill and world perspective. In the view of research findings it may be concluded that ICT promotes global citizenship among undergraduate university students.

Keywords: Global citizenship, Information and communication technology, Factor Analysis, Non parametric.

1. INTRODUCTION

Information and Communication Technology (ICT) is considered as one of the most necessary tools in the present world, is of crucial importance to the students as an instrument creating possibilities of achieving global citizenship. ICT provides a chance for all students to become aware, busy, and have the knowledge to link within an interconnected world, but ICT proficiency skills should be given to all students, to become enabled and involved in the global society where contact and use of information are the most valuable resources [1]. It's necessary for undergraduates being better equipped, engaged, informed, globally intelligent and have the global awareness of latest events [2]. Global citizens persuade other citizens to actively participate in the global citizenship and play a positive and effective role in the society and become helpfully involved in the life of their university, neighborhood, communities and the wider world. These individuals adapt themselves quickly and they act globally, collaborating and competing globally and this empowerment is provided by Information and communication technologies [3].

Undergraduate students must get the ICT skills to become ICT literate global citizens who have the knowledge, skills and understanding [4] to become up to date and change their way of thinking, realizing the responsibility, and know their duties and rights at societal, national and at global levels. They must become active and engage citizen of the globe [5]. They must respect diverse values and give respect to others way of living. They must develop communication skill and become global aware citizens. They must promote their social, moral, and cultural values through ICT to become global citizens. ICT literate citizens are globally aware of purpose in life and diverse values in human life. By using ICT they develop reading, writing, listening and speaking skills of the English language through sharing ideas and reflecting others and on their own ideas. By applying ICT they become a problem solver by analyzing events and issues. If Pakistani students have the ability to use ICT tool than they have the potential to bring a change and making themselves Global Citizens. The world today needs to prepare young citizens to develop a perspective beyond the national boundary, to understand the impact of individual citizenship behavior's upon the other parts of the world, and should focus on developing an international perspective among the students.

*Address correspondence to this author at the Iqra University, Karachi, Pakistan; E-mail: shaguftawalimuhammad@gmail.com

ICT has been playing a basic part in the research and development. Being a developing country a special

amount of budget on research and development, is allocated to ICT research and development for both public and private sector universities. The ICT develops the concept of international learning and further brings change in the degree of global awareness, understand more about other parts of the world and further awareness that we are actually living in one global world, and what happens in one part of the globe may have impacts. In this context, the development of the awareness of being a global citizen is increasingly important in today's globalized world.

1.1. Aims of Global Citizenship

The foremost aim of global citizenship is to empower the students to make their own decision regarding values and knowledge which they have learnt about global issues. Students should be well equipped with the necessary computer skills to give them the confidence and ability to bring positive change to the world by becoming the part of global society.

1.2. Why is Global Citizenship Necessary?

Global citizenship is necessary for the development of a well-formed child, who feels caring and loving about the world, to enable children to behave on well with others and to have a positive self-efficacy. It is important that children should meet their own potential, but in developing global citizenship, cooperation is considered to be more useful skill than the competition. Youth of Pakistan is our present and our future also depends upon them.

All the above discussion clearly indicates that ICT promotes global citizenship among university students. The purpose of this study was to investigate the possible association of ICT and the factors that promote global citizenship among undergraduate students of Karachi, Pakistan.

1.3. Objective of the Study

The purpose of this is to determine how ICT promotes and develops the global citizenship and impact of ICT on global citizenship, and evaluates the strengths and weakness of five global factors. It also explores the impact and implications of ICT towards global citizenship among undergrads of Pakistan. To identify the possible relation between ICT and the factors that promotes global citizenship among undergraduates of Pakistan. Furthermore, the study

also examine and determine the effect of ICT in developing global knowledge, acceptance of cultural diversity, development of communication skill, and stimulating student's global awareness i.e the knowledge of their responsibilities and human rights.

1.4. Research Questions

Proceeding from the foregoing purposes to attain the objective of the study, the current study was guided by two main questions:

RQ1. Is there any relationship between ICT and factors that promote global citizenship among university undergrads?

RQ2. What is the impact of ICT on factors that promote global citizenship among university undergrads?

1.5. Hypothesis

Two main hypotheses were developed to answer the above discussed research questions:

H1: There is a significant difference in the responses for ICT and the factors that promote global citizenship among university undergrads.

H₂: There is a significant impact of ICT on factors that promote global citizenship among university undergrads?

2. MATERIALS AND METHODS

Present study is a descriptive and cross sectional study.

2.1. Participants

Participants in this study are the undergraduate's students of Computer Science Department of two private universities; Iqra University and Sir Syed University and two public sector universities; Karachi University and N.E.D University. Stratified random sampling technique was used for quantitative aspect of the study in the data collection. A sample of 425 university students (male and female) of both public and private universities was selected. The sample had both gender representations, 278 males (69.5%) undergrads from both sectors, 122 females (30.5%) undergrads from both sectors and having four age groups [(17-18) (19-20) (21-22) (23-24)]. The students were enrolled in the IT department.

2.2. Instrument

To, collect data, the tool used in this study is Global Citizenship Survey questionnaire. The Global Citizenship Survey was a self-report instrument that was designed with the consultation of experts (subject experts and educationalist) to explore the underlying relation between ICT and the factors that promote global citizenship among university undergraduate of Karachi, Sindh, Pakistan. The GCS survey has divided into four sections. Section 1 of questionnaire comprised of demographic data which was designed to get the demographic information about the university undergrad students, gender, age, education level and university type. Section 2 of global citizenship survey was framed to obtain the data of university students' skills regarding the use of ICT, a questionnaire consisting of 5 items has been used to find out the frequency, location and use of ICT. Section 3 of the Global Citizenship Survey was designed to use to obtain the data on Students' skills regarding ICT proficiency, a questionnaire consisting of 11 items has been used with rating scale or Likert-type-scale. The content of the validity of this questionnaire was approved by the group of experts, faculty members and researcher of Karachi University and Iqra University. For the further validation, Cronbach's alpha coefficient was used to find the reliability of the questionnaire. The Cronbach's alpha coefficient was found to be 0.85.

The reliability value of measures indicated that the responses of the respondents were highly consistent. Based on the current scientific evidence and practical needs of students, we believe that item of the questionnaire correspond greatly to the valid scientific sources and include the main determining factors of ICT that facilitates the global citizenship among undergraduate students of Karachi, Pakistan.

2.3. Data Analysis

For the analysis of data, we have applied basic and advanced statistical techniques. Furthermore, an advanced multivariate technique factor analysis was also conducted to reveal the hidden pattern of the data. The basic purpose of used of this advanced multivariate technique is to identify the factors of ICT that identify and promote global citizenship among undergraduate students. Numerical computations of the data were carried out by SPSS 21. The significance values of all statistical tests are interpreted with 95% confidence level that is $\alpha = 0.05$.

3. RESULT AND DISCUSSION

3.1. The Reliability of the Instrument

The reliability of the instrument was tested prior to the main analysis. Cronbach alpha was used to measure the reliability of each construct in the instrument. There are total 6 constructs in the instrument. Construct 1 represents ICT skill proficiency and it contains 11 items. Construct 2 consisting 5 items that explains the student's perception towards world perspective. Construct 3 contains 5 items and it represents the role of ICT towards the development of communication skill among undergraduate students. Construct 4 is for students responsibilities at individual, societal and national level and it also contains 5 items. Construct 5 deals with the possible effect of ICT on student's global problem solving attitude. The reliability of each construct was measured by Cronbach alpha and the reliability value of each construct is given in Table 1. The reliability of the items greater than 0.5 are considered to be high and consistent [6]. The reliability value of each construct in Table 1 shows that the reliability value of is fairly high that can be taken to mean that responses of students within each construct are highly consistent to each other. [7] has also discussed the reliability of data in social science research.

Table 1: Reliability of all Items in each Construct

Construct	No. of items	Cronbach Alpha
ICT	10	0.84
WP	5	0.81
RVLS	5	0.79
CS	5	0.80
RISNL	5	0.76
GPS	5	0.85

3.2. Factor Analysis

This section deals with the quantitative analysis of the global citizenship survey. The responses of students on each item are measured on a Likert Scale. The range of students responses vary from Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree. For the numerical computation of the responses we assign 1,2,3,4 and 5 for each response respectively. In this section of study an advanced multivariate technique Factor Analysis was carried out on the overall data of the global citizenship survey to explore the factors that represents the global citizenship factors on the responses of students. The

Table 2: Factors Cut off Value and % of Variation of ICT Questionnaires

Factors	Linear Combination	Cut off value	% Of variation
Factor 1	$0.7(Q2WP+Q3WP+Q4WP-Q1SF)+0.5(Q7SF+Q8SF)+0.4(Q1WP+Q10SF)$	0.4	24%
Factor 2	$0.7(Q2CS+Q4CS+Q4WP)-0.5(Q2WP+Q5SF)+0.7(Q3CS+Q4SF+Q4WP)$	0.5	19%
Factor 3	$0.8(Q1WP+Q4RVSL+Q9SF)-0.4(Q1SF+Q4SF+Q3WP)+0.3(Q1RVSL+Q2GPS+Q4GPS+Q7SF)$	0.3	14%
Factor 4	$0.7(Q2GPS+Q3CS+Q1WP)+0.6(Q3SF+Q2WP+Q3RIVSL)$	0.4	9%
Factor 5	$-0.8(Q2GPS+Q1SF+Q5SF+Q3CS)+0.5(Q1GPS+Q7SF+Q2CS)-0.3(Q2RISNL+Q4RISNL+Q4CS)$	0.3	7%

instrument consists of 6 construct. Q1 to Q11 belongs to construct 1 that represents ICT skill proficiency. Q12 to Q16 are the items of construct 2 that explains the student's perception towards world perspective. Construct 3 that is the role of ICT towards the development of communication skill among undergraduate students contains Q17 to Q21. Construct 4 also contains 5 items from Q22 to Q26 and it deals with student responsibilities at individual, societal and national level and it also contains 5 items. Construct 5 deals with the possible effect of ICT on student's global problem solving attitude and it contains Q27 to Q32.

For the adequacy of data that is the data are suitable for the factor analysis Kaiser Meyer Olkin (KMO) criteria was considered and its value is found to be 0.784. This value indicates that the Global citizenship survey data are adequate and good enough to carry out factor analysis. The scree plot and eigen value suggests that only 5 factors are considered to be important as their eigen values are greater than 1. For the interpretation and discussion of the results we consider first 5 factors with eigen value greater than 1.

Table 2 presents the factor loading scores of each factor with their corresponding cut off value and percent of variation of each factor. For the interpretation and naming of factors that emerged from the ICT data, we calculated a threshold value or cut off value of all five factors simultaneously. We considered only those items in the factors whose factors loading are greater than their threshold value and ignore all the items with factor loadings less than their threshold value.

The overall result indicates that there is a consistent pattern in each factor. In our data factor 1 include combination of items of world perspective and computer proficiency skills. This can be taken to mean that most of the students considered that computer

proficiency skill are useful to better understand the world perspective. Factor 2 emerges with the high loading of communication skill and world perspective of students. This indicates that ICT helps undergraduate students to enhance their communication skill. The remaining factors can also be interpreted on the same fashion.

4. CONCLUSION

The results of factor analysis indicate that factors with items of high positive loading are the communication skill and world perspective. In the view of research findings it may be concluded that ICT promotes global citizenship among undergraduate university students.

5. RECOMMENDATION

This study provides an overview of possible interrelation between ICT and global citizenship in private and public sector universities in Karachi, Pakistan. It is suggested that a comparative study can be done among private and public sector universities regarding the consequences of ICT on undergraduate students. The author further suggests that other advanced statistical technique like Dicriminant Analysis etc can also be applied on the same instrument for further in-depth research.

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