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DEVELOPMENT

Teachers' Attitudes towards the Use of Information and Communication Technology in the Instructional Process of Secondary Education in Sri Lanka

K.G.S.K. Perera[1*,] S.P. Karunanayaka[2] and A. Ariyaratne[2]

[1]*Department of Information Technology, Faculty of Science and Technology, National Institute of Education*
[2]*Department of Secondaryand Tertiary Education, Faculty of Education, Open University of Sri Lanka, Nugegoda, Sri Lanka.*

Corresponding author: Email: kgskperera@yahoo.com

1 INTRODUCTION

The implementation of Information and Communication Technology (ICT) plans in the school sector of Sri Lanka commenced way back in 1983 (Department of Computer Education, 2000). In 1994, instead of providing computers to individual schools, a computer centre per educational zone was instituted. In 1999, the Ministry of Education commenced providing schools with ICT laboratories known as Computer Learning Centres, for the purpose of promoting the use of ICT in education. Since then there has been exponential growth in the investment on ICT in the school sector. At present, ICT laboratories have been established in 3,675schools (Ministry of Education, 2016). Over 100,000 teachers have been trained in basic ICT skills and have been provided introductory courses of Computer Assisted Learning (Pasqual, 2011).

Despite the fact that education systems have heavily invested in ICT since 1980s, there is a dearth of indicators of the levels acquisition of ICT and its usage in education. The mis-match between the weak evidence and the growing use raises many questions about the nature of ICT-related investments in the education sector in developing countries. (Tolani-Brown *et al.,* 2009). Therefore, it is worthwhile to investigate this scenario in order to identify the factors affecting the unsatisfactory nature of using ICT in education.

This study was conducted with the following objectives: to ascertain the strength of the attitudes of Sri Lankan school teachers towards the use of ICT in their instructional process, and to determine whether there is a significant difference of attitudes among teachers of Science, Geography and English among themselves and with respect to ICT teachers.

1.1 Research Questions

1. What is the strength of internal aspects of the attitudes of teachers which affect the use of ICT in the instructional process?
2. What is the strength of external aspects of the attitudes of teachers

which affect the use of ICT in the instructional process?

3. Is there a significant difference in attitudes among teachers of Science, Geography and English?
4. Is there a significant difference in attitudes among ICT teachers and non-ICT teachers (Science, Geography and English)?

Internal aspects of the attitudes refers to those attitudes directed towards oneself, whereas external attitudes are directed towards external agents who could have an influence on the issue one is interested in (McLeod, 2014). External aspects such as teachers' attitude towards the Principal (Tondeur *et al.,* 2008) and towards the teacher-in-charge of the ICT lab (Dexter *et al.,* 2002) are considered in this context. The selection of subject areas was based on ICT as benchmark for other subjects. Science, Geography and English are purposively selected to represent different subject areas where ICT integration is more practical within the Sri Lankan secondary education curriculum and literature review.

2 METHODOLOGY

2.1 Research Design

The research was designed as a survey conducted by administering attitude questionnaires on a Likert type response scale.

2.2 Sample

The population was the teachers who have received ICT training and are teaching at schools with ICT laboratories. The sample was constituted by 280 secondary school teachers teaching the subjects ICT, Science, Mathematics and Geography, randomly selected and stratified over the subjects taught, representing three Provinces of the country (to represent high, medium and low facility school

sectors) as indicated in Table 1.

Table 1: Composition of the sample

Province	Number of participants				
	ICT	Science	English	Geography	Total
Western	35	30	30	25	120
Southern	20	20	20	20	80
Uva	20	20	20	20	80
				Total	280

2.3 Methods of data collection and analysis

Eight attitude questionnaires with a Likert-style scoring scale were administered to the sample of 280 teachers to inquire into the following aspects of their attitudes.

1. The teacher's enthusiasm towards computers
2. The teacher's anxiety about computers
3. The teacher's attitudes about the negative impacts of computers on society
4. The teacher's attitude about the productivity of computers
5. The teacher's avoidance of computers
6. The teacher's attitude towards the principal of the school
7. The teacher's attitude towards the teacher-in-charge of the ICT lab
8. The teachers' computer self-efficiency

Questionnaires 1, 2,3,4,5 and 8 were used to measure the internal aspects of the teachers' attitudes while questionnaires 6 and 7 were to measure the external aspects.

Questionnaires 1 to 5 are standardized tools (Christensen and Knezek, 1998) and

Questionnaire 8 was adapted from a standardized questionnaire (Ulas, 2010).

The assessment of the teachers' attitude towards the Principal (6) and teacher -in-charge of the ICT lab (7) were developed by the researcher based on the information found in the literature review (Tondeur *et al.,* 2008; Dexter *et al.,* 2002).

These two questionnaires were piloted with 29 and 25 teachers respectively. Reliability test (Cronbach alpha) for questionnaires 6 and 7 were 0.91 and 0.76 respectively.

Test of One-way ANOVAs was applied on each questionnaire with Scheffe Posthoc at 0.05 significant level.

A quantity called Proximity to Maximum Possible Value (PMPV) was defined and computed in order to check how close the mean value of a construct returned by each questionnaire was to the maximum possible value.   This facilitates the comparison of the relative strength of each attitude.

[PMPV= (mean/maximum possible value that could be scored on the questionnaire)*100]

Reliability test (Cronbach alpha) for questionnaires 6 and 7 were 0.81 and 0.74 respectively.

3 RESULTS AND DISCUSSION

Table 2: Internal aspects of attitudes of teachers measured in PMPV

Attitude	Science	Geography	English	ICT
Enthusiasm towards computers (Q1)	79.82	80.84	79.20	83.33
Anxiety about computers (Q2)	27.77	36.76	35.64	32.97
Attitudes about negative impacts of computers on society (Q3)	58.91	54.96	55.22	52.31
Attitude about productivity of computers (Q4)	79.16	81.87	82.17	83.83
Computer self-efficacy (Q8)	65.59*	67.55	64.78*	73.14*
Avoidance of computers (Q5)	44.20	45.54*	43.08	38.66*

* Significant at .05

3.1 What is the strength of the internal aspects of the attitudes of teachers affecting the use of ICT in the instructional process?

According to the Table 2, measured in terms of PMPV, it is revealed that the teachers' enthusiasm to computers and belief of productivity of computers stayed at a higher level. Teachers' computer self-efficacy was at a satisfactory level. Teachers do not have a negative attitude about ICT as indicated by the low mean values in anxiety to computers and low mean value in tendency to avoid computers. The agreement of teachers regarding the negative impact of computers on society needs improvement, although it is above 50% mark.

Table 3: External aspects of attitudes of teachers measured in PMPV

Attitude	Science	Geography	English	ICT
Attitudes towards Principal of the school (Q6)	69.3*	78.93*	72.00	73.60*
Attitudes towards ICT lab-in-charge teacher (Q7)	62.0*	67.4	61.7*	76.2*

* Significant at .05

3.2 What is the strength of external aspects of attitudes of teachers affecting the use of ICT in the instructional process?

According to the Table 3, strength of the external aspects of the teachers' attitudes is also at a satisfactory level. Teachers do not have a negative attitude towards the Principal with respect to the use of ICT in the instructional process and, they have a positive attitude towards the teacher in-charge of the ICT laboratory.

3.3 Is there a significant difference in attitudes among teachers of Science, Geography and English?

It has been found that (Table 3) in the case of internal aspects of the attitudes, differences of attitudes are significant only in Q5 and Q8. In Q5, the difference between Geography teachers and ICT teachers was significant (>.024). In Q8, difference between ICT teachers and English teachers was significant (>.007) and difference between ICT teachers and Science teachers was significant (>.018). It is not surprising that computer self-efficacy differs between ICT vs English and ICT vs Science, but it is hard to explain why there is no significant difference between ICT teachers and Geography teachers in this case. In Q6, the difference between Geography teachers and Science teachers was significant (>.024). In Q7, the difference between ICT teachers and English teachers was significant (>.001) and the difference between ICT teachers and English teachers was significant (>.001). However, the opinions of English and Science teachers was lower than

Geography teachers in both these cases. Even the teacher-in-charge of the ICT Lab also admits that he/she is unable to provide 100% service to non-ICT teachers in the use of ICT for teaching (PMPV=76.2).

3.4 Is there a significant difference in attitudes among ICT teachers and non-ICT teachers (Science, Geography and English)?

As evident from Figure 1, the attitudes of ICT teachers are better than those of non-ICT teachers, in all eight aspects. Except in the case of questionnaire 6 (Teachers' attitude towards Principal) in all the other cases, the differences of attitudes between ICT and non-ICT teachers are significant as per the t-statistics at 0.05 significance level.

The highest attitude difference is recorded from the attitude of non-ICT teachers towards the teacher in-charge of the ICT. This is not surprising since ICT teachers are the teacher-in-charge of the ICT labs themselves and they were referring to themselves when answering the questionnaires. However, PMPV value is 73.14 indicating that they themselves are not pleased with their contribution to non-ICT teachers in the use of the ICT laboratory.

The next highest difference is reported from Questionnaire 8 (computer self-efficacy) which is again acceptable as ICT is the ICT teachers' main subject area. Apart from those, the other differences range from 0.19 to 5.61 implying that there is no broad difference in attitudes between ICT and non-ICT teachers.
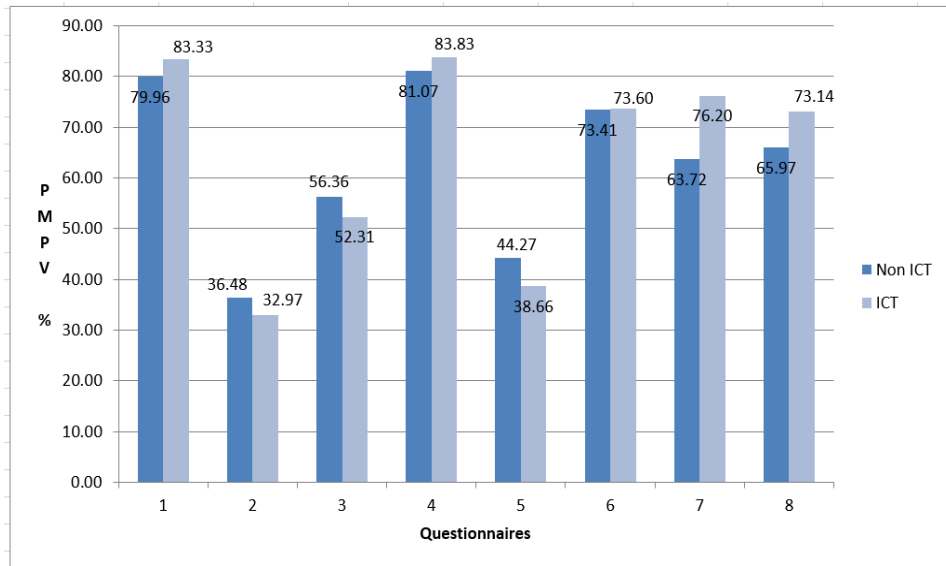
Figure 1: Proximity to Maximum Possible Value of the Overall Mean of each attitude

4 CONCLUSIONS AND RECOMMENDATIONS

The study revealed that teachers have a positive attitude towards the use of ICT in their instructional process. Their enthusiasm and opinions about the productivity of computers were high and these have been cross-checked in terms of anxiety to and avoidance of computers. External factors, which were assumed to be stumbling blocks in the use of ICT in instructional processes, such as the Principal's involvement and assistance of the teacher in-charge of the ICT laboratory were not found to be negative from the participants' point of view. Variation of attitudes was not found to be significant among non-ICT teachers except in the case of the attitude towards the Principal's involvement where Geography teachers had a higher value than that of the Science teachers.

Despite these positively-rated factors and teachers' sound computer self-efficacy the study demands more investigations of a qualitative nature into the poor use of ICT in the instructional process.

REFERENCES

Christensen, R. and Knezek, G. (1998). Parallel forms for measuring teacher's attitudes toward computers. Proceedings of SITE 98. Association for the Advancement of Computing in Education: (pp. 831-832). Charlotteville, VA.

Department of Computer Education. (2000). National examination in computer applications. Sri Lanka: National Institute of Education.

Dexter, S. L., Anderson, R. E., and Ronnkvist, A. M. (2002). Quality technology support: What is it? Who is it? And what differences does it make? Journal of Educational Computing Research, 26 (3), pp 265-285.

Ministry of Education. (2016). Master Plan and Implementation Roadmap for Effective use of ICT in Sri Lanka General Education which Leads to Policy Framework. Korea: KERIS

Pasqual, A. (2011). Sri Lanka's journey in ICT in education: Bench Marking International Experiences. KERIS – Global Symposium on ICT in Education: (pp.7 – 10).

Tolani-Brown, N., McCormac, M., and Zimmermann, R. (2009). An Analysis of the Research and Impact of ICT in Education in Developing Country Contexts. Journal of Education for International Development, 10(4), pp 79-90.

Tondeur, J., Keer, H., Braak, J. and Valcke, M. (2008). ICT integration in the classroom: Challenging the potential of a school policy. Computers and Education, 51, pp 212–223

Ulas, A.H. (2010). Instructors' computer usage states and self-sufficiency to use computer. Scientific Research and Essays, 5(23), 3606-3612