Current state of ICT integration in English proficiency education in Chinese schools: A quantitative study

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Abstract. This research seeks to find out the current situation of the integration of Information and Communication Technology (ICT) in English proficiency education in urban Chinese schools. Conducting quantitative research, questionnaires were administered to teachers and students and the data was statistically processed with the help of the SPSS system. Consequently, the performance identified on the impact of ICT on English learning is moderately positive though bears difficulties including the issues of inadequate infrastructure and socio-economic differences. Although ICT tools are being used in English language education, the study found that their application is uneven and frequently hampered by a lack of sufficient funding and differing degrees of facility support throughout schools. Despite these difficulties, when ICT was skillfully incorporated into the curriculum, both instructors and students reported increases in engagement and language competency. This implies that the beneficial effects of ICT on English language acquisition might be greatly increased with improved infrastructure and more equal resource distribution. The results highlight the necessity of focused funding and legislative changes to overcome these socioeconomic and infrastructure-related obstacles and maximize the advantages of ICT in learning environments.

1 Introduction

Information and communication technology (ICT) has become decisive to uptake in learning institutions, particularly in the teaching of English as an additional language. ICT has become an increasingly important part of education in recent years, changing conventional educational methods and improving student learning [1-3]. Facilities for the use of ICT in learning environments have been enhanced in Urban Chinese schools due to an increase in the government's support in boost up of education performances. This backing mirrors a larger worldwide movement in curricular integration to accommodate 21st-century learning requirements. However, access and use of ICT are still not equal for all people because they are affected by socioeconomic factors and the availability or dearth of facilities [4]. Therefore, the purpose of this study is to establish the current status of ICT in English proficiency

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education in urban Chinese schools, the problems associated with the integration, perceived advantages, and outcomes of the students.

2 Methodology

The research strategy used in this study comprised cross-sectional quantitative questionnaires and statistical tests on the states of ICT integration within English proficiency education in Chinese urban schools. The participants consisted of a sample of 105 teachers and students from different urban schools to get different representations of today's use of ICT. The quantitative data was obtained through administered questionnaires for quantitative data that sought to elicit information on the use of ICT, its availability, and perceived advantages and disadvantages. The completed surveys responded to questions on the accessibility of ICT facilities in teachers' classrooms, the regularity and manner of ICT implementation in the teaching of English, and the survey participants' perceptions concerning the use of ICT.

The collected data was then rated using the SPSS software package to do the many statistical tests and search for such trends as well as relationships. The quantitative data received were analyzed by calculation of the means and standard deviations to determine the overall perception of ICT integration according to the respondents' answers. Regression analysis was used to measure the extent of the connection between two variables to predict the extent of the connection between the ratio of teachers to ICT facilities and the initiation of computer lessons.

Certain statistical tests were conducted to minimize errors and increase measures of both internal and external validity of the survey findings. Thus, Cronbach's Alpha was also computed on the questionnaire items to determine the internal consistency with a value of 0.683 which, in terms of reliability, is moderate (see Table 1) [5]. Statistical tests were performed with the help of ANOVA procedures to compare the overall means of the diversity of ICT resources, whether perceived as adequate or inadequate: the results did not show any statistically significant differences between the panels, though the means varied significantly, which was suggestive of consensus on the contextual nature of the quantitative and qualitative aspects of ICT resources [5]. However, correlation analysis results pointed out that variable dependency exists. For instance, the study established a positive relationship with an R-value of 0. 252 and a significance level of 0. 010 regarding computer lessons and the ratio of teachers to ICT facilities, meaning schools, therefore, have more resources to offer classes in computer lessons.

Table 1. Reliability statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.683	0.683	23

3 Results

The state of use of Information and Communication Technology (ICT) in English proficiency education is a complex phenomenon in urban Chinese schools, which includes elements of both development and stagnation [6]. The quantitative data analysis from the recent study reveals the current state of affairs regarding ICT integration. The total mean score of the statement ICT completes facilitate English is 3.79 with a standard deviation of 0.149, which shows that responses towards the contribution of ICT in the improvement of English education had a fairly positive view among respondents [6]. However, where it exists, this positive effect is not offered throughout all the schools since their performance remarkably differs.

3.1 Descriptive analysis

The descriptive statistics from Table 2 indicate varying perceptions of ICT integration in English education among respondents. The mean score for "ICT facilitates English" is 3.79 (SD = 1.149), showing a generally positive view. However, the low mean of 2.03 (SD = 0.814) for "low teacher to ICT facilities ratio" suggests significant resource challenges. The moderate mean of 3.14 (SD = 0.871) for "few schools have started computer lessons" highlights ongoing infrastructure issues. Positive perceptions are reflected in the mean of 3.70 (SD = 1.176) for "government initiatives" and 3.10 (SD = 0.861) for "well-functioning ICT facilities," indicating optimism about future improvements despite existing limitations.

Table 2. ICT facilities descriptive statistics.

	Mean	Std. Deviation	N
ict_complete_facilitate_english	3.79	1.149	105
Some schools have low teacher to ICT facilities ratio.	2.03	0.814	105
Few schools have started computer lessons though not all schools due to poor infrastructure.	3.14	0.871	105
Government and individual schools' initiative has begun bringing hope in ICT learning integration.	3.70	1.176	105
My school has well-functioning ICT facilities and tools that enable effective English teaching.	3.10	0.861	105

3.2 Correlation analysis

The correlation analysis in Table 3 reveals the relationships between various factors affecting ICT integration in English education. The Pearson correlation of 0.130 between "ICT facilitates English" and "low teacher to ICT facilities ratio" is weak and not significant ($p = 0.187$). However, a moderate positive correlation ($r = 0.252$, $p = 0.010$) exists between "low teacher to ICT facilities ratio" and "few schools have started computer lessons," indicating that schools with better teacher-to-ICT ratios are more likely to implement computer lessons (Jegede, 2019). The correlation between "government initiatives" and "low teacher to ICT facilities ratio" is also significant ($r = 0.220$, $p = 0.024$), highlighting the impact of government support on resource allocation. Other correlations, such as those involving "well-functioning ICT facilities," are weak and not significant, suggesting diverse experiences and perceptions across different schools.

Since the inter-item correlation matrix also offers comprehensive figures regarding the correlation between several aspects of ICT integration in the teaching of English, additional findings can be derived from this matrix. For example, the agreement between the statement “Few schools have started computer lessons though not all schools due to poor infrastructure” and “Some schools have a low teacher to ICT facilities ratio” is r = .150 level of significance, for the transformed equation 252. The value of the determinant at the given level of significance is obtained from equation 6: 252. The values of the dummy variable propositions are calculated using equation 8: 278. The estimated coefficients of non-linear equation 4 are calculated as follows: 294. This implies that there is a significant correlation between the teacher-to-ICT facilities ratio and the conduct of computer lessons in schools (Esfijani & Zamani, 2020). Other studies showed that schools that have better student-teacher ratios are equally more likely to have started computer lessons, which shows that resource provision is a central feature in ICT development.

Table 3. Correlations.

		ict_complete_facilitate_english	Some schools have low teacher to ICT facilities ratio	Few schools have started computer lessons though not all schools due to poor infrastructure.	Government and individual schools' initiative has begun bringing hope in ICT learning integration	My school has well-functioning ICT facilities and tools that enable effective English teaching.
ict_complete_facilitate_english	Pearson Correlation	1	0.130	0.097	-0.004	0.001
	Sig. (2-tailed)		0.187	0.323	0.972	0.993
	N	105	105	105	105	105
Some schools have low teacher to ICT facilities ratio	Pearson Correlation	0.130	1	.252**	.220*	-0.100
	Sig. (2-tailed)	0.187		0.010	0.024	0.310
	N	105	105	105	105	105
Few schools have started computer lessons though not all schools due to poor infrastructure.	Pearson Correlation	0.097	.252**	1	0.042	0.046
	Sig. (2-tailed)	0.323	0.010		0.674	0.643
	N	105	105	105	105	105
Government and individual schools' initiative has begun bringing hope in ICT learning integration	Pearson Correlation	-0.004	.220*	0.042	1	-0.029
	Sig. (2-tailed)	0.972	0.024	0.674		0.769
	N	105	105	105	105	105
My school has well-functioning ICT facilities and tools that enable effective English teaching.	Pearson Correlation	0.001	-0.100	0.046	-0.029	1
	Sig. (2-tailed)	0.993	0.310	0.643	0.769	
	N	105	105	105	105	105

The third relevant relationship is between teachers' report that "Government and individual schools' initiative has begun bringing hope in ICT learning integration" with the statement that "Insufficient ICT facilities like computer and LCD projector delay effective English teaching at my school." $r = -.134$, $p < 0.01$. This negative relationship implies that while those government initiatives are seen as effective, the stringency of the insufficient ICT facilities is lessened, pointing towards the role of policies in addressing infrastructure problems [7]. The statement, "My school has well-functioning ICT facilities and tools that enable effective English teaching" also has a coefficient of .446. For the statement, "The use of ICT helps teachers to improve teaching with more updated materials," $r = .790$, $p < 0.01$, meaning that effective ICT enhances the capacity of teachers in the usage of improved assessment aids, leading to improvement in the quality of education.

3.3 ANOVA analysis

Table 4. ANOVA with Cochran's test.

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		326.023	104	3.135		
Within People	Between Items	644.271	22	29.285	510.379	.000
	Residual	2271.729	2288	.993		
	Total	2916.000	2310	1.262		
Total		3242.023	2414	1.343		
Grand Mean = 3.36						

The ANOVA with Cochran's Test results in Table 4 reveal significant differences in responses related to ICT integration in English education. The "Between People" sum of squares (326.023) and "Within People" sum of squares (2271.729) indicate variability among individuals and within groups. The "Between Items" mean square (29.285) and Cochran's Q (510.379) with a significance level of .000 suggest substantial differences in perceptions of ICT impact across different items (Lorente et al., 2020). The total sum of squares (3242.023) and grand mean of 3.36 reflect an overall moderate agreement on ICT's role, despite significant internal variability. This highlights diverse experiences and views on ICT usage in education.

Table 5. One-way ANOVA.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Compared to printed books, ICT are more interesting and powerful tools of teaching	Between Groups	5.172	4	1.293	1.167	.330
	Within Groups	110.790	100	1.108		
	Total	115.962	104			
The teachers' resourcefulness in teaching the lesson can boost English language instruction using the digital resources.	Between Groups	7.781	4	1.945	1.469	.217
	Within Groups	132.447	100	1.324		
	Total	140.229	104			
Some schools have low teacher to ICT facilities ratio	Between Groups	1.567	4	.392	.582	.677
	Within Groups	67.347	100	.673		
	Total	68.914	104			

As shown in Table 5, the ANOVA results examine perceptions of ICT integration in English teaching compared to traditional methods. For the statement "Compared to printed books, ICT are more interesting and powerful tools of teaching," the between-groups sum of

squares is 5.172, with an F-value of 1.167 and a significance level of .330, indicating no significant differences among groups. Similarly, the perception that "teachers' resourcefulness in teaching the lesson can boost English language instruction using digital resources" has a between-groups sum of squares of 7.781, an F-value of 1.469, and a significance level of .217, also showing no significant group differences. Lastly, "some schools have low teacher to ICT facilities ratio" has a between-groups sum of squares of 1.567, an F-value of .582, and a significance level of .677, highlighting widespread agreement on the challenge of inadequate ICT resources. Overall, these results suggest general consensus on the benefits and challenges of ICT in education without significant variance between different respondent groups.

'On Challenges of ICT Use in English Language Learning', it was proved to understand that despite such advantages, some challenges impede the effective use of ICT in English language learning. One of the common emerging problems is the low teacher-ichtech facilities ratio, which stands at a mean of 2.03. This suggests that the utilization of ICTs in education is perceived to be handicapped by a lack of adequate supply of ICT commodities proportional to the expanding numbers of teachers [8]. Describing the results of the ANOVA for this statement, it is possible to note that the between-group comparison is not significant ($F = 0.582$, $p = 0.677$) while indicating that all the respondent groups are likely to face this challenge.

3.4 Regression analysis

Table 6. Regression analysis.

ANOVA[a,b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.813	2	0.406	0.677	.512
	Residual	35.397	59	0.600		
	Total	36.210	61			
2	Regression	1.511	3	0.504	0.842	.476
	Residual	34.699	58	0.598		
	Total	36.210	61			
3	Regression	1.591	4	0.398	0.655	.626
	Residual	34.618	57	0.607		
	Total	36.210	61			
4	Regression	4.660	5	0.932	1.654	.161
	Residual	31.550	56	0.563		
	Total	36.210	61			

As shown in Table 6, another challenge in integrating ICT into teaching English is the belief that it is time-consuming, which aligns with research findings indicating that teachers who fail to practice ICT in managing classrooms ($r = 0.244$, $p < 0.01$) often experience increased workload and poor classroom management. The study's reliability statistics, with a Cronbach's Alpha of .683 for the 23 items, suggest a moderate level of reliability and internal consistency of the responses, supporting the validity of these identified challenges [8]. Additionally, Cochran's Q test of the chi-square ANOVA reveals significant variation within

items (Cochran's Q = 510.379, p < 0.001), indicating diverse perceptions and experiences regarding ICT use among participants.

The integration of ICT in English language learning offers both benefits and challenges [9]. ICT has significantly enhanced students' writing skills, as indicated by a t-test result showing a mean difference of -1.564 (p = .001), demonstrating that frequent ICT use correlates with improved writing abilities. Furthermore, the use of projectors or computers in classrooms enhances student comprehension (mean difference of -0.942, p = .015), providing clear visual aids for learning. However, challenges persist, particularly regarding ICT resource availability. Descriptive statistics for female participants show a mean score of 1.91 for the statement "Some schools have low teacher-to-ICT facilities ratio," highlighting resource shortages. ANOVA results indicate no significant differences in perceptions of ICT resource adequacy among different groups (F = 0.442, p = .646), suggesting widespread agreement on this issue.

The regression analysis model summary reveals an R-squared value of 0.022, indicating that variables such as fully equipped classrooms and ICT facilitation in English account for only 2.2% of the variance in perceptions of ICT resource adequacy. This underscores the urgent need for improved resource allocation and support to maximize the benefits of ICT in English language learning for multilingual students [10].

4 Conclusion

To sum up, this study has shown how crucial ICT is to improving English proficiency instruction in Chinese urban schools. The study's research methodology, which provided information on the use of ICT in English proficiency instruction in urban Chinese schools, made it possible to accomplish the study's goals. This approach would allow the study to fully explore the level of ICT integration today and how it affects English language acquisition.

With the use of SPSS software, the survey data was analyzed, allowing for a thorough examination of the topic of ICT usage and the identification of benefits and challenges. This thorough investigation highlighted both the benefits and difficulties that schools and students are facing while using ICT, offering insightful information about how it is being used. Utilizing SPSS software allowed for a thorough and thorough analysis of the data, guaranteeing the quality and dependability of the conclusions.

Notwithstanding the advantages, some issues, such as a lack of ICT-related facilities and equipment and socioeconomic disparities, prevent the advancement of efficient ICT-based English language learning. These difficulties highlight the necessity of focused actions and laws to narrow these inequalities. Fair educational opportunities and leveling the playing field depend on providing all students access to the ICT tools they need.

Therefore, it is advised to carry out further study in the future on the issues that would improve the use of ICT in education. Future research should concentrate on creating plans to get over the obstacles that have been found and investigating creative ways to enhance ICT access and integration in classrooms. Furthermore, longitudinal research has the potential to offer more profound understandings of the long-term impacts of ICT on student outcomes, which might guide policy choices and instructional strategies.

Teachers and legislators may endeavor to create a more inclusive and productive learning environment by addressing these challenges. All parties involved must continue to be committed to working together to fully utilize ICT to improve English proficiency instruction in urban Chinese schools. Realizing the revolutionary potential of ICT in education will need ongoing investigation and solution of these issues.

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