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IMPACT OF MOBILE APPLICATION-BASED LEARNING ON ENGLISH LISTENING SKILL DEVELOPMENT AMONG POLYTECHNIC STUDENTS IN TAMIL NADU

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ABSTRACT

English as a language has displayed absolute dominance and anarchic destruction of local regional languages across the world. It has been accepted that English is the universal accepted language for communication for business and professional activities. This continued domination of English has its deepened effects on India and its official communication with the world. It could be seen that English still remains with its undisputed authority and dominance in its communicating link with the world. It could also be seen that this has led to the total destruction of local Indian languages which has left the country and from the people's mind. English is still the official language for social, professional & business communication across the country. This has also created a pre requisite to read, learn & master this language for proficiency and communication in all official & business platforms. Engineering is a global program also when read in Indian curriculum – the need for learning in English as the platform remains questionable, challenging & intriguing. This research is an exploratory & conclusive research on the problems and issues which prevail in mobile based English learning & listening skill development language for business correspondence & communication among polytechnic students. The nature and extent of problems associated with it would also be studied. The impact of mobile based English on polytechnic student's professional career would also be examined. Suitable strategies and solutions for excellence in mobile English language learning for listening skill development among polytechnic students towards 2030 would also be provided.

In this study Primary data would be collected from 30 polytechnic students studying various diploma courses in Government Polytechnic College, Sevvapet, Thiruvallur district, Tamil Nadu. The continued challenges and problems in polytechnic students for mobile English learning&listening skill development as a student would also be explored. Also, the Questionnaire is used to collect the data, which could bring in more authentic information on this domain. The Data analysis would be done with a SPSS as the suitable strategies and solutions for mobile English learning & listening excellence for polytechnic students would be provided.

Keywords: Mobile Based English Learning in Tamil Nadu, Polytechnic Students and Mobile English Learning Methods, Mobile Oriented English Learning Strategies, Rural Dimensions and Strategic Mobile English Listening Development Approaches

1. INTRODUCTION

The modern world has changed and evolved with technology. New tools and methods have added more refined operations which have changed the functional, dynamic management of personal (Marzuki, 2026) business and professional living. It is factor which has provided modernity, comfort and sophistication to our lives. This technological tool has fabricated the entire world in to new horizons and spheres which are beyond our imagination. The world has become more refined and progressive with this tool. It has been purposive, determinal, focused and holistic in its nature and functions. It could modify, alter and improve our way of living and standards. It has larger scope and applications as it has wider value additions which has given innovative solutions for every field and industry. These cutting-edge solutions and strategies have provided benchmarking standards for global operations and functions which are updated every moment with new impetus.

1.1. TECHNO CHALLENGES

This has provided the new outlook and the thinking as it has made us the more individualistic and dependent on it. The nature of the social relations & individual for the mutual cooperation and the coexistence has modified as this tool has eroded and evaded it totally. The Personal gratification and satisfaction become the priority with the techno associations as the mutual benefit and concerns for others has reduced the lot. The Techno machine is giant & vast as it has comprised the whole human community and made the replica of itself with the man. Generally, Man become purposive, robotic, and mechanical in thought process & the applications he uses & then converses with the machine language. Also, the Emotions, sentiments, & affection are slowly getting eroded as principles of production, output and performances become more important. Man become more industrial in 20th century but he continued to remain only industrious as humane elements is removed.

The conscious transformation of humane into human who will works for 24 hours without the social and personal life is magical motivation provided by technology. Technology has changed the human life (Rafique et al., 2026) but it modified the nature of the human, and their total living, perception and their thinking.

The massive damages of technology is huge, when it embraced the human life as man always felt it is impossible to live without technology. Generally, the people must constantly and consistently remembers that the technology is human invention and the people now became the horrible slaves who just execute its command, and we feel that the people's life is meaningless without it. These All basic functions of human life is combined with technology (Dewi et al., 2026) thus there has some difficulties remained out of technology &to live peaceful life.

The structured way of living and our activities is organized, and it can be determined with the techno focus which could measures our performances. Generally, humans have forgotten that they are humans and they do need the rest and the happiness. The search for the happiness is resulted in the creating this techno devil which taken the total control of human living. This techno devil has surpassed the people's imagination, and thinking and the capabilities as it has become so inclusive in our social & the personal living. However, we see some of the new innovations that provided the sophistication & comfort to our living –question remains that we really needed this technology and its applications? Man was peaceful, happier, and healthier, without this techno invasion which masterfully executed its plans for control of this universe. It is hard for us now to imagine the momentary life without it as we crave and create more without knowing reason, destination or purpose. The techno process is complex as we have really failed to define its scope (Shaheed et al., 2026) as we feel rattled with its organic holistic integrative control and behavior.

The control nature is dominating and we continued to function as the element to obey its commands and operate on the time without having time to play or rest. In the traditional days work was only choice– but in personal life and happiness is modern day's choice as man has to spend time for it. The Technological solutions is dramatic as it hold the man's control and his activities 24x7 and monitor them. The World without technology is impossible now and we need to think how we reduce disasters, calamities(Huang&Wu, 2026) and issues because of this techno invasive demon which the integrated world like cloud on sky.

Here in skills and capabilities of individuals and groups do matter which define the usage and pathways of technology, its focus and applications. During the medieval times, the world has not been seen(Sumbul et al., 2026) or applied with mathematical focus.

During the nineteenth century we could find that technology has been focused more on applications – which has been used to a larger and greater extent in medical sciences. Slowly the process and orientation of technology drifted in 19th century from applications to discoveries and inventions which were new and totally unwarranted. The careless choice of humans in this direction has created this disastrous technology which has impeded our social and personal living in the modern era. Technology has clearly documented the changes with the generation of human birth as we could find associations which describe it. Technology has become the ascribing feature which determines(Kruk, 2017) human birth and generations. Man is proud of his technological skills which has made him multitasking and social media oriented.

But the burdens and problems of technology has never been explored or studied which has been attempted with this thesis(Carr, 2020) had done research on the derogatory effects of internet and it's dominating influences on our brains and our functioning.

The physical and intellectual effects of technology and its role on human beings can be illustrated at various levels which are explained that the technology by nature has a determinal and dominating role in shaping the socio-economic consequences and outcome of human living. But the choice rests with man as he has to choose the pathways of progress of technology (Moehrle&Caferoglu, 2019) which has destructive influences on mankind which cannot be ignored totally.

The Researchers warned on technology origins & its detoriating effects which affects mankind and their living. Also, these tools are utilized as the substitute for the human usage but these tools were emerged as the power centers which control the behavior, outcomes and, thinking of human.

The Technology is the effective combination of the technique and skills which are operated and also applied in the needed conditions. This is the skillful art that has to be managed with the real time skills which provides the impact and outcomes. But, it is known that this creative tool(Allena Refi, 2026) needs to be effectively handled which increase the productivity. But in several cases it is found that it has the destructive effects which make the inhuman behavior and machine-like methods. Though technological tools usage has leads to the desirable end results, it may not lead to the prosperity & humane society's development which is the real challenge. Also, this unwanted side effects of the technology & its applications are need to be evaluated.

Generally, Pythagorean technology concept has been considered as the efficient combination of the biological sciences, historical methods & its implications on the society. The Patents, major & minor inventions, the research contributions with the R &D impetus are measures. But this methods avoids & totally neglects the humane considerations & situations. The effects on society & its impact on sustainability & development have not been considered. Inventions and technology innovations are not measured as the single factor for development of the society as welfare and well-being of its citizens are need to be considered. Though it is known and found that this technological impact on the social welfare and humane wellbeing is not evaluated or studied so this study attempted on this.

Systems approaches to the technology focus on functional aspects and dimensions. The Technical functions of technology & its implications on social activities & its outcomes are needs to be evaluated. The systems method is rigid and then structured as it has desired outcomes that are attainable – but it cannot be attributed as technological success. The technology success is defined as it should increase members wellbeing which is very limited. As disastrous (Sharaf-Addin et al., 2026) and undesirous technology effects are need to be measured as this study is evaluative and critical examination of these dimensions & factors in the societies. Economic orientation of technology by the nature functions and assumes on principles of economic welfare and benefits. Income, productivity, profits, and cost could be the factors of measurement. It is also known that the economic benefits alone cannot justify the technology and its implications. There has the need for more evaluations on the other factors which leads to the social balance.

Although, as the industrial society is performance & profit oriented – it could be very difficult to reach out from this conceptual orientation. Also, non-economic goals of social achievement & technology & prosperity needs to be evaluated. Though, it is known that dimensions of the mobile technology&its applications in English listening skill development (Sodikova&Ergashev, 2026) among polytechnic students are not studied as this study is an attempt on it. This study also assess various challenges and problems related to the mobile technology access and usage for English language listening skill development among Tamil Nadu Polytechnic students. This study attempts in this direction and provide new dimensions and orientations for effective mobile learning and English listening skill development.

1.2. MOBILE EDUCATION & MOBILITY IN ENGLISH LEARNING

Mobiles have become an integral, essential part of modern education. Modern education (Noman et al., 2026) has been transformed with mobiles as it has also induced mobile learning for 24x7 among global students. These mobile oriented learning has given progressive assistive pathways for English learning and usage which has become closer and comfortable for modern students. This has integrated and facilitated class room learning as it has become more essential for mobile educational transformation towards future. The potential scope (Murodova et al., 2026) for modern mobile oriented English learning has given a new impetus and directives. It is also evident that role and impact of this transformative modern Mobile oriented English learning (Kayyali, 2026) and its mobility effects has not been researched or evaluated with Tamil Nadu polytechnic students hence this study attempts on it. This could also change the immersive mobile impact on students as it could lead to futuristic English learning strategies and orientations as this study is an attempt on these dimensions & aspects which have never been studied or evaluated before among Tamil Nadu polytechnic students. This study is an attempt on the same.

2. LITERATURE REVIEW

(Fan et al., 2023) done an empirical exploratory investigation in to the various mobile apps which are currently in use for English language learning. This study identifies the various gaps which prevail between English teachers&app developers. This study also provides various ways and means for effective integration of mobile apps which could be used in English language teaching&learning. English class App was developed and this was tested in out of class context which could help us better understand its usage & applications. In this study the primary data is collected by utilizing the Questionnaire & semi structured interviews. It was found in this study that mobile apps could find an effective usage in English learning as it is the most appropriate modern techno tool for self-study. This study has been conducted with Students at the Xi'an jiaotong-Liverpool University (XJTLU), China. This research study was conducted with participants were the sophomores majoring in marketing or economics at XJTLU, China, and age ranged from 18 to 21 in two different phases phase one & two. 40 students participated in Phase 1 & 2 of this study. It was found in this study that many student respondents were positive towards mobile learning and it was found be useful in English learning. However, it is also found that the mobile techno applications & usage in English listening skill development has not been researched among Polytechnic students of Tamil Nadu as this research attempts on it.

(Metruk, 2021) had done research study on smart phones usage particularly in English learning apps towards English language learning. This study been done with Slovak students as EFL students are a part of this study. The perceptions of Slovak ELF students towards mobile learning for English learning and usage have been explored in this study. This study has been done with 48 male respondents & 110 female respondents who had agreed to respond their opinions in Likert five-point scale. It was found in this study that gender had a differential impact on student's responses towards English mobile app usage and its effectiveness towards English learning. However it is also found that the role of gender in English learning using mobile Apps have not been studied with Tamil Nadu polytechnic students and this study is attempt on it.

(Kruk, 2017) done research study as an on look on the student learners and their mobile usage. This study is an attempt to decode the mobile usage for English language learning. This study has used interview data as it has provided new perspectives, orientations & strategies for future also. Primary data for this study has been collected from 20 students. In this study majority of the students felt that mobile usage increased their general awareness on English language and its potential applications. It was found in this study that Information management & language learning became easier and elegant with mobile apps. However, the role and impact of mobile apps towards English listening skill development has not been studied with Tamil Nadu polytechnic students as this study attempts on it which could provide new impetus and directives for future.

(Yurdagül&Öz, 2018) done research study to determine the attitudinal influences on mobile English learning & transformation of modern education methods. mobiles have become an integral, essential part of modern education. Modern education has been transformed with mobiles as it has also induced mobile learning for 24x7 among global students. These mobile oriented learning has given progressive assistive pathways for English learning and usage which has become closer and comfortable for modern students. This has integrated and facilitated class room learning as it has become more essential for mobile educational transformation towards future. However, the role and applications of

mobile technology towards integrative English listening skill development has not been studied or researched among Tamil Nadu polytechnic students as this study is an attempt on it. The progressive, purposive and functional directives of English mobile apps towards English listening skill development & student transformation have not been evaluated as this study attempts on it. This study provide futuristic strategies for mobile oriented English learning and listening

(Yang, 2025) done a purposive research study on Optimization role towards Personalized English Learning Paths. This study evaluates Mobile Interaction Technology role on English learning methods, process & approaches. This study finds that although mobile apps are useful in English learning the need for personalized methods and approaches has to be met out. Specific English learning mobile apps which can provide personalized approaches and solutions has to be designed, tested & implemented among student's community. However the role and applications of English mobile learning apps towards English listening skill development has not been researched or empirically evaluated with Tamil Nadu polytechnic students as this study is an attempt on it.

3. RESEARCH METHODOLOGY

3.1. AIM

This study aims to evaluate impact of mobile techno learning methods on English listening skill development among Polytechnic students. Also, it aims to assess extent of availability of techno resources in this Polytechnic. This study would also assess the impact of background of family & rural aspects in mobile oriented English skill listening skill development. It would assess the impacts of family towards mobile English skill listening & development among polytechnic students. This study would also assess the rural mobile English educational opportunities for polytechnic students.

3.2. RESEARCH TYPE

This research type is exploratory & also conclusive in its approach. Being exploratory it explores several functional applications of the mobile apps for English listening skill development. This study is conclusive which provide conclusive specific approaches and strategies for English listening skill development using mobile apps.

3.3. RESEARCH METHOD

This study is empirical and quantitative. This study is quantitative as primary data is collected from 30 polytechnic students studying various diploma courses in Government Polytechnic college, Sevvapet, Thiruvallur district, Tamil Nadu.

3.4. PROBLEM STATEMENT

Mobiles have provided new mobility to the techno world with a global orientation&renewed (Zaet&Alkharbash, 2026) perspectives. Mobiles have given new applications&techniques which have transformed global teaching and learning systems. There is a problem which remains regarding the purposive mobile applications towards English learning. Although we could find numerous mobile apps for English language learning (Fang et al., 2026) teaching & applications – these are found to be lesser user friendly in its nature and purpose. There is a lack of research orientation on mobile English app usage for English listening skill development (Zairjanovich&Anatolievna, 2026) among polytechnic students which has to be researched empirically. There are various problems and issues regarding mobile apps and its usage for English listening skill development among polytechnic students this research attempt on it.

3.5. RESEARCH QUESTIONS

1) What is impact of mobile applications on English learning&listening skill development?
2) Do mobile apps increase English listening skill development?
3) Does rural educational environment affect English listening skill development?
4) Does specific course of study affect English listening skill development?
5) Will gender affect English listening skill development with mobile apps?

3.6. OBJECTIVES

1) To find out specific impact of mobile applications on English learning & listening skill development among Tamil Nadu polytechnic students
2) To determine the role of rural educational environment effects on English listening skill development
3) To know the impact of specific course of study effects on mobile app based English listening skill development
4) To assess the impact of gender on English listening skill development with mobile apps
5) To suggest several ways and means to increase mobile app based English listening skill development

3.7. DATA COLLECTION METHODS

In this study, the Primary data would be collected from 30 Tamil Nadu polytechnic students studying various diploma courses in Government Polytechnic college, Sevvapet, Thiruvallur district, Tamil Nadu. Primary data would be collected by utilizing the Questionnaire which would be administered across Tamil Nadu polytechnic students. Then the Secondary data would be collected from various published sources from 2017 till date.

3.8. DATA ANALYSIS METHODS

Data would be collected and analyzed using SPSS. Correlation, regression & ANOVA. SEM model would be provided and outcome of this study which could provide specific new impetus & strategies for English listening skill development using Mobile apps.

3.9. SCOPE & LIMITATIONS

1) This study is confined to Government Polytechnic college, Sevvapet, Thiruvallur district, Tamil Nadu
2) This study is confined to diploma students studying various Engineering courses in this Polytechnic college
3) This study sample size is limited to 30 students studying various Engineering courses in this Polytechnic
4) For this study the independent variable would be mobile application oriented English learning&listening – as the moderating variables are rural or urban background, access to technology, exposure to English, family&learning opportunities – as the dependent variable would be sustainable English learning and development.
5) This study is empirical and quantitative. In this study the primary data would be collected by utilizing the Questionnaire using Google form as other forms of primary data collection do not form a part of this study
6) Data analysis is done by utilizing the SPSS as other prominent softwares are not applied in this study
7) Data analysis would cover correlation, regression&ANOVA as an SEM model is outcome of the study as other data analysis methods do not form a part of this study.
8) This study has been done with students perspective on mobile app applications towards English listening skill development as the teachers perspective do not form a part of this study.
9) In this study the term Tamil Nadu polytechnic has been used as a generic name which refers to one specific polytechnic in Tamil Nadu – as it does not refer to Tamil Nadu in a geographic sense.

4. DATA ANALYSIS AND INTERPRETATION

Table 1

Table 1 Demographic Analysis

Age	Frequency	Percent
19 years	20	48.80
20 years	13	31.70

21 years	8	19.50
Gender	**Frequency**	**Percent**
Male	25	61.00
Female	16	39.00
Course	**Frequency**	**Percent**
Computer Application	22	53.70
EEE	19	46.30
We have English subject during first year only	**Frequency**	**Percent**
Yes	32	78.00
No	9	22.00
Do you have regular English classes even after first year	**Frequency**	**Percent**
Yes	30	73.20
No	11	26.80
Total	41	100.00

When it comes to contextually understanding the findings that are shown below, the demographic study of the respondents is very important since it sheds light on the makeup of the sample population as well as their academic background. Based on the age distribution, it is evident that a significant majority of the individuals who participated in the survey belong to the younger spectrum of the academic spectrum. To be more specific, 48.80 percent of the respondents are 19 years old, making this age group the most prevalent one in the sample. The subsequent percentages are: 31.70% are 20 years old, and 19.50% are 21 years old, which is the lower number. Given the distribution, it seems that many respondents are still in starting stages of their undergraduate. This may have the impact on their maturity level, their capacity to adjust to the new information, and their exposure to academic fields like, English. Due to fact that the peoples are likely to have the similar academic experiences and cognitive development phases, concentration of replies within certain age range helps to increase uniformity perspectives.

The findings pointed out that the strong male predominance, with the male respondents accounted for 61% of sample and female respondents accounting for 39% of people who participated in survey. Based on this gap, it may be deduced that sample is mostly males, which may be reflective of enrollment patterns in selected courses or institutions. This distribution having the effect on overall findings because that the gender differences in learning preferences, communication styles, and language ability may have the effect on responses. The significant no. of. female respondents ensures that variety of perspectives are well represented, which makes it easier to arrive at the accurate interpretation of findings.

According to distribution of responses and according to course, 53.70% of them are enrolled in the Computer Application programs, whereas 46.30% are enrolled in Electrical and Electronics Engineering (EEE) programs. This equal proportion across 2 academic fields shows that study has collected the opinions from students who were focused on the engineering and the students who were interested on technology advancements. The higher predisposition for the digital learning environments and perhaps greater exposure to English through the programming languages, documentation, and the online resources may be indicated by the marginal preponderance of students who are studying computer application. EEE students, may experience the several kinds of academic engagement with English when they are participating in technical education. This is particularly true when it comes to grasp of theoretical concepts and technical terminology.

Seventy-eight percent of those who participated in the survey indicated that English was a part of their first-year curriculum, while twenty-two percent of them said that it was not. The result that has been reached emphasizes the fact that English is widely included into the first stages of higher education for the vast majority of students. This is because English is a crucial subject that is meant to increase academic competence and communication skills. As a consequence of fact that smaller proportion of students who have not had first-year English experience are enrolled in the courses in

which English is either integrated into other fields of study or is not explicitly emphasized, there may be disparities in level of language competence among respondents.

Also, the study which examined the continuation of English classes beyond first year found that 73.20% of respondents said that they continued to attend the regular English sessions after initial year, whereas 26.80% stated that they did not continue to do so. This suggests that many students continues to get the systematic English language instruction beyond basic level, which improve their skills in terms of communication, comprehension, and professional performance. Yet, fact that more than the quarter of respondents do not have consistent interaction with English classes increases the substantial concerns about consistency of language development within individual student population. Some students may have disparities in their level of proficiency, confidence, and ability to engage effectively in academic and professional communication if they are not given opportunity to continue their formal English training beyond 1st year of schooling.

Table 2

Table 2 Correlation Analysis

Correlations	Impact of mobile applications	Role of rural educational environment	Study effects on mobile app	English learning listening skill development
Impact of mobile applications	1	.924**	.843**	.897**
Role of rural educational environment	.924**	1	.851**	.903**
Study effects on mobile app	.843**	.851**	1	.841**
English learning listening skill development	.897**	.903**	.841**	1

The in-depth understanding of relationships between principal variables which were investigated in the study is provided by correlation analysis. These relationships include impacts of mobile applications, the significance of rural educational environment, effects of study on mobile applications, and English learning, with the specific emphasis on development of listening skills. The study results suggests that all of variables having the strong positive correlation with one another. However, presence of two asterisks (**) indicates that these correlations are statistically significant at high level of confidence. The observed pattern of strong positive correlations suggests existence of coherent framework in which educational, technological and environmental, factors are intimately connected in terms of influence they have on development of English language skills among the elementary school students.

Findings indicates that there has the statistically significant positive connection of 0.924 between impact of mobile applications and educational environment in rural areas. Finally, the conclusion can be drawn from this, that the educational environment is intimately connected to the effectiveness and impact of mobile applications in rural settings. There has the correlation between perceived effect of mobile applications on learning and degree to which the educational environment in rural areas is useful and helpful. As a result, mobile applications have become an essential component of the educational setting in rural areas, which are characterized by a limited availability of traditional educational resources. This may be an indication of an increased reliance on digital technologies.

A result of 0.897 indicates that there has the significant and strong correlation between mobile applications effect and development of English listening abilities. It may be deduced from this that mobile applications use are considerably improves the English listening abilities of pupils. There is little doubt that accessibility of audio-based learning aids, interactive modules, and multimedia content via mobile platforms contributes to significant enhancement of this connection. Evidence reveals that the students who make regular use of the mobile learning applications have the higher level of improvement in their listening ability, which is the vital component of language acquisition.

The score of 0.903 indicates that link between rural educational environment and development of English listening abilities is strongest of all correlations were found. It is clear from this that educational environment in rural areas has the significant influence on ability of pupils to develop their listening abilities in English. The language learning setting that is ideal, perhaps strengthened by instructors, infrastructure, and access to digital resources, seems to considerably enhance outcomes of language learning. This relationship highlights fact that when the technology is crucial, environment in which learning takes place is on par with, if not more so than, any other factor.

According to this study findings, mobile applications having the strong positive connections with all other categories. Specifically, mobile applications effect has correlation of 0.843, rural educational environment has the correlation of 0.851, and development of the English listening skills has correlation of 0.841. Findings of this research suggest that level of engagement that students have with mobile-based study strategies and benefits which they gain from utilizing these approaches are consistently connected with the ambient variables and learning outcomes. In spite of fact that they are considerably smaller than other correlations, they still imply the strong and meaningful link, which lends acceptance to idea that mobile-assisted learning is the great approach for enhancing educational experiences.

Table 3

Table 3 Regression Analysis

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	68.371	4	17.093	52.474	.000b
Residual	11.727	36	0.326		
Total	80.098	40			
Coefficientsa	B	Std. Error	Beta	t	Sig.
(Constant)	0.167	0.354		0.471	0.64
Impact of mobile applications	0.323	0.152	0.373	2.132	0.04
Role of rural educational environment	0.411	0.188	0.392	2.18	0.036
Study effects on mobile app	0.196	0.127	0.197	1.547	0.13
Gender	0.134	0.185	0.047	0.727	0.472

a Dependent Variable: English learning listening skill development

The regression analysis results shed light on individual and collective impacts of the number of independent variables on development of English listening abilities, which is dependent variable. With F-value of 52.474 and significance level of 0.000, full model summary reveal that regression model is statistically important. This is shown by fact that model is statistically important. Based on this finding, it can be concluded that independent variables, which include influence of the mobile applications, educational environment in the rural areas, the study effects on mobile applications, and gender, provides the robust explanatory framework for differences in listening skills development among students. When compared to residual sum of squares (11.727), significant regression sum of squares (68.371) indicates that model accounts for the large amount of variation in dependent variable. This demonstrates overall strength of model and shows that it is a good match for data.

The in-depth comprehension of unique influence which each predictor has may be achieved through the examination of numerous coefficients. The mobile applications effect is statistically significant, with p-value of 0.04, which is lower than conventional threshold of 0.05. The result is positive unstandardized coefficient (B = 0.323), which indicates that there has the positive influence. This indicates that development of English listening skills may be considerably improved via mobile applications uses. The fact that this variable has a standardized beta coefficient of 0.373 suggests that it has the pretty large impact in comparison to other factors that are taken into consideration in model. This research highlights mobile learning tools value, which often has included the audio-visual materials and interactive exercises, in process of enhancing students listening abilities.

With unstandardized coefficient of 0.411 & p-value of 0.036, educational environment in rural areas is discovered as significant predictor. The fact that this variable has highest standardized beta coefficient of 0.392 implies that it has most significant effect of all variables that are included in model. The study findings suggest that English listening skills is significantly improved in rural areas by providing the students with educational environment that is both plentiful and supportive in resources. The existence of positive link between better educational settings and increased listening ability development suggests that these settings, may include access to digital resources, help from teachers, and infrastructure, are linked with the improved listening ability development. The relevance of contextual and environmental factors in determining results of learning is highlighted by this.

It is clear from the p-value of 0.13 that the effects of the research on mobile applications, although having a positive correlation with the dependent variable (B = 0.196), do not meet the criteria for the statistical significance. This suggests that while there is a positive connection between 2 variables, the correlation is not strong enough to make a clear statement that this variable has an independent influence on the development of listening abilities within the contextual framework of this model. The impact may be represented indirectly via other variables, such as the overall influence of mobile applications or the educational environment, or the variability in a single aspect may not be sufficient to yield a significant consequence. Both of these possibilities are possible.

Given that the p-value for gender as a demographic variable is 0.472, it is concluded that the gender does not have significant impact on development of English listening abilities. Based on the very low standardized beta value (0.047), it may be deduced that gender has a negligible and insignificant influence on the variable that is being investigated in this instance. The conclusion that can be drawn from this is that the development of listening abilities in English is mostly unaffected by gender differences within the sample, and that the factors that were studied in the model provide equivalent advantages to female and male students.

There is no statistically significant difference between baseline level of listening skill development and zero when all of the independent variables are set to zero, as shown by the fact that the constant term in the regression model is not statistically significant. It is important to note that this does not in any way weaken overall significance of model.

Table 4

Table 4 Reliability Analysis	
Reliability Statistics	
No. of variables	Cronbach Alpha
12	0.893

The high degree of internal consistency was found in instrument that was utilized in the study, as shown by Cronbach's Alpha value of 0.893 for 12 variables that were included in the scale. This was discovered via the reliability analysis of the instrument. This score is much higher than generally accepted threshold of 0.70, and it is often regarded as minimum criteria for acceptable dependability in social science research as it is commonly viewed. A Cronbach's Alpha is close to 0.90 suggests that questions in questionnaire demonstrates the great consistency in measuring fundamental constructs, which in turn increases the credibility and reliability of data that was acquired.

According to high reliability coefficient, variables in the study are well-aligned and exhibits the large degree of interrelatedness. This is shown by fact that coefficient is high. This demonstrates that respondents have comprehended questions and have provided answers that are consistent with them, hence reducing the likelihood of random error or ambiguity occurring during the process of measurement. The fact that the 12 variables are consistent with one another suggests that they collectively include the parts of the study that are wanted, such as the effect of mobile applications, educational environment, and learning outcomes, in a way that is coherent and consistent.

Furthermore, the Cronbach's Alpha value of 0.893 suggests that scale is reliable and adequately robust for future statistical studies, such as correlation and regression, which were carried out in this study. Due to fact that reliable measurement is necessary for the meaningful interpretation of correlations between variables, this contributes to an increase in the confidence of the findings. Because of the high degree of internal consistency, it is guaranteed that any patterns or correlations that are discovered are more likely to be actual connections than they are to be inconsistencies in the measuring instrument.

Table 5

Table 5 Chi Square Analysis 1						
	English learning listening skill development					
Impact of mobile applications	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Strongly Disagree	5	2	1	0	0	8
Disagree	0	4	1	0	0	5
Neutral	0	1	4	0	0	5

Agree	0	0	0	2	2	4
Strongly Agree	0	0	1	7	11	19
Total	5	7	7	9	13	41
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	67.966a	16	0.00			
Likelihood Ratio	65.845	16	0.00			

Chi-square research analyzes the link between mobile applications and the development of English listening abilities. It provides important insights on whether or not these two variables are independent of one another or whether or not they have a considerable correspondence with one another. The cross-tabulation makes it evident that there has the systematic link in responses, in which agreement levels with mobile applications effects are closely coincide with degrees of development in listening skills. For instance, the participants who are in complete agreement that mobile applications have an impact are mostly centered in the "agree" and "strongly agree" categories for the enhancement of listening abilities, with seven and eleven responses, respectively. In a similar vein, those who recognize impact of mobile applications often claim an increase in their listening skills, which indicates a continuous upward trend. This distribution indicates the positive correlation between two variables, wherein the greater perceived impacts of the mobile applications aligns with the enhanced listening skill outcomes. On other hand, respondents who are strongly disagrees or disagrees regarding the influence of mobile applications primarily occupy lower tiers of listening skill development. Specifically, "strongly disagree" and "disagree" are 2 categories that fall into this category.

The Further evidence that this observed link is true is provided by statistical results. Pearson Chi-Square statistic is 67.966 with 16 degrees of freedom, and related p-value is 0.00. This is the significant amount lower than standard significance criterion of 0.05, that is traditionally utilized. The fact that this is case indicates that null hypothesis, which asserts that variables are independent of one another, and it may be rejected with the high degree of confidence. There has the link that may be considered statistically significant between impacts of mobile applications and development of English listening abilities. As the consequence of likelihood ratio test producing a significant value of 65.845, with same degrees of freedom and the p-value, this conclusion is strengthened, and the robustness of finding is confirmed.

This relationship is shown by important diagonal dominance that can be described in table. This dominance is characterized by fact that many responses are grouped together along agreement categories that correspond to them. Taking into consideration this tendency, it seems that increase in perceived effectiveness of mobile applications is correlated with development in listening capacities. This development highlights mobile learning value which helps in process of language acquisition, mainly in terms of increasing the auditory comprehension via use of multimedia content, interactive activities, and communication systems which provide instant feedback.

Table 6

Table 6 Chi Square Analysis 2

English learning listening skill development						
Role of rural educational environment	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Strongly Disagree	5	2	0	0	0	7
Disagree	0	4	1	0	0	5
Neutral	0	1	6	0	1	8
Agree	0	0	0	7	7	14
Strongly Agree	0	0	0	2	5	7
Total	5	7	7	9	13	41
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	79.880a	16	0.00			
Likelihood Ratio	74.761	16	0.00			

In second Chi-square research, link between rural educational environment and development of English listening abilities is examined. The study findings provide vital insights into ways where the contextual educational factors influence language acquisition outcomes. The cross-tabulation reveals a well-organized pattern in distribution of responses, which indicates that there has the strong association between perceived quality of educational environment in rural areas and development of listening skills among students. In highest tiers of listening skill development, specifically in "agree" and "strongly agree" categories, with substantial frequencies of 2 and 5, respectively, the respondents who firmly feel that rural educational environment is relevant are largely found. This is true in "agree" category. Similarly, the individuals who acknowledges significance of rural educational environment are exclusively concentrated in higher outcome categories, with 7 responses each in both “agree” and “strongly agree.” This persistent clustering in upper categories unequivocally suggests that more supportive and resourceful rural educational environment correlates with improved listening skill development.

Also, the persons who are most likely to be found in lowest tiers of listening skill development are those that are either highly opposed to or disagree with significance of what rural educational environment is. When it comes to listening capacity growth, for example, many respondents who strongly disagree fall into "strongly disagree" and "disagree" categories, with 5 and 2 responses, in each of those categories. The presence of positive link is further supported by this downward clustering, that indicates educational environments that do not provide appropriate support are related with worse listening ability scores. Although, neutral group still tends toward moderate levels of listening skill development, which suggests the variation without contradicting overall tendency. The neutral group shows the pattern which is considerably more scattered than other groups.

The statistical data provides the strong evidence that these observed patterns are accurate. With 16 degrees of freedom, Pearson Chi-Square statistic is 79.880, and associated p-value is 0.00. This result is lower than conventional threshold of 0.05, that can be considered to be statistically significant. Though, this finding definitely reveals that null hypothesis of independence between variables may be rejected, so confirming that there has statistically significant link between rural educational environment and English listening abilities development. This result is supported by likelihood ratio test, which produced value of 74.761 at same significance level. This demonstrates reliability and robustness of conclusions from investigation.

The link strength is made obvious by unmistakable diagonal pattern that mentioned in the table. This pattern demonstrates that increased agreement levels with rural educational environment are firmly connected with increased listening skill development levels. The dominance of diagonal indicates strong and direct correlation, which highlights fact that developments in educational environment, like supportive pedagogical practices, enhanced infrastructure, access to learning resources, and technology incorporation, can significantly improve students capacity to cultivate listening skills in English.

Table 7

Table 7 Chi Square Analysis 3

	English learning listening skill development					
Study effects on mobile app	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Strongly Disagree	5	2	0	0	1	8
Disagree	0	5	0	0	0	5
Neutral	0	0	6	0	1	7
Agree	0	0	1	8	4	13
Strongly Agree	0	0	0	1	7	8
Total	5	7	7	9	13	41
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	94.453a	16	0.00			
Likelihood Ratio	79.193	16	0.00			

In final Chi-square analysis, association between mobile applications effects on development of English listening abilities is investigated. This research provides the complete view on how student's participation in mobile-based study practices leads in measurable language learning outcomes. The cross-tabulation demonstrates systematic pattern, with many responses aligned with comparable degrees of agreement, which suggests that there has the definite connection between two variables. Students who are in complete agreement that mobile applications improve their study habits are mostly found in highest levels of listening skill progress. This is true in "strongly agree" part, which has 7 responses, while "agree" group has smaller number of responses. Then, the majority of individuals who agree with study findings about effects of mobile applications fell into "agree" and "strongly agree" categories of listening skill development, with 8 and 4 responses. The consistent upward trend suggests that effective use of mobile applications for learning purpose is related with increased listening skills development.

On the other hand, persons who are in the lower tiers of listening skill development are the ones who are more likely to reject or strongly disagree with the conclusions of the research about mobile applications. For instance, among those who strongly disagree, the bulk of responses are classified as "strongly disagree" and "disagree," with five and two responses, respectively, and a minor presence in higher categories. In a similar vein, persons who voice disagreement are solely placed in the "disagree" category of listening capacity development, which indicates that there is a standstill in language skill among this group of people. This distribution lends acceptance to notion which a correlation exists between insufficient or inefficient use of mobile applications for educational purposes and reduction in listening abilities development.

The neutral category exhibit moderate trend, with many answers concentrated in "neutral" listening skill classification and inclination towards elevated levels, indicating that inconsistent or partial interaction with mobile apps results in moderate outcomes in listening skill development. Despite this, general strong trend described in the table, which unequivocally demonstrates positive correlation between variables, is not diminished in any way.

These perspectives are supported by statistical results, that provide compelling evidence to back them up. The result of Pearson Chi-Square statistic is 94.453, and there has 16 degrees of the freedom. p-value is 0.00, which is much lower than the standard threshold of 0.05. As a result, null hypothesis of independence is categorically rejected, which provides evidence for existence of statistically significant link between research effects on mobile applications and English listening abilities development. The further confirmation of reliability and robustness of this link is provided by likelihood ratio of 79.193, which is also significant at the same level.

The Chi-square value in this investigation is higher than value in two research that came before it, which suggests that there has strong connection between effects of mobile applications and listening abilities development. This correlation is highlighted by fact that table has diagonal concentration of responses, which suggests that when students perceive greater benefits from using the mobile applications for learning, their listening skills increases accordingly.

Table 8

Table 8 Chi Square Analysis 4

	English learning listening skill development					
Gender	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Male	3	5	3	6	8	25
Female	2	2	4	3	5	16
Total	5	7	7	9	13	41
Chi-Square Tests	Value	df	p value			
Pearson Chi Square	1.413a	4	0.84			
Likelihood Ratio	1.399	4	0.84			

4th Chi-square analysis analyzes link between gender and English listening abilities development. This investigation purpose is to determine whether or not differences in the listening skill outcomes are related to gender-based inequalities among participants. The cross-tabulation demonstrates that distribution of responses in both male and female categories is uniform and dispersed. There has the no apparent or regular pattern of concentration that would imply the strong relationship between 2 groups. When it comes to development of listening skill, male respondents, who

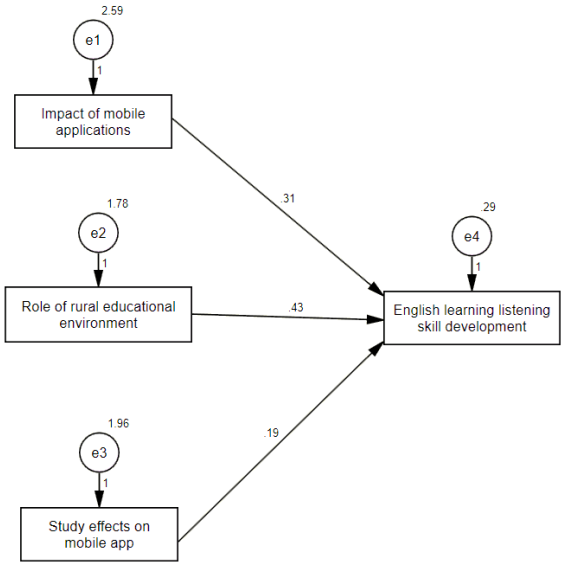
make up majority of sample, are distributed in all categories. They have slightly higher frequencies in "agree" and "strongly agree" categories, which are six and eight. Though, they demonstrate significant representation in lower and neutral categories. Likewise, female respondent's exhibits balanced distribution, with responses recorded at all levels: 5 instances of "strongly agree," 3 instances of "agree," and some representation in lower and neutral categories. According to this distribution, female and male students have comparable levels of development in their listening abilities, and there does not seem to be any discernible advantage that one group has over other.

In contrast to the Chi-square analysis that was performed before, which revealed a prominent diagonal pattern that indicated a significant relationship between variables, this table does not have such an orderly alignment displaying the variables. It would seem that the responses are dispersed in a random fashion, which suggests that the variety in the development of listening abilities is not often related with gendered differences. A lack of dependence between the two variables is shown by the fact that both groups display similar patterns with respect to their perceptions of whether or not their listening skills have improved.

These results from the statistical analysis provide strong support for this statement. p-value associated with Pearson Chi-Square statistic is 0.84, which is higher than traditional threshold of 0.05. The statistic has 1.413 value with four degrees of freedom. It seems that the null hypothesis of independence has not been denied, as shown by the increased p-value, which indicates that there has the no statistically significant association between gender and development of English listening abilities. In addition to p-value of 0.84, the likelihood ratio of 1.399 provides another evidence that supports this conclusion, hence boosting the credibility of the finding.

Given that there was no significant relation between 2 variables, it can be concluded that gender does not play a vital role in development of listening abilities in this study. The findings imply that other variables, such as the impact of mobile applications, the educational environment in rural areas, and the use of mobile devices in academic settings, have a more significant role in influencing the outcomes of learning. Because it demonstrates that male and female students have similar potential to improve listening skills when they are provided with equivalent learning opportunities and resources, this research is relevant because it highlights this fact.

4.1. STRUCTURAL EQUATION MODEL



Dependent	Independent	Estimate	S.E.	C.R.	P
English learning listening skill development	Impact of mobile applications	0.312	0.053	5.894	0.00
English learning listening skill development	Role of rural educational environment	0.429	0.064	6.727	0.00

English learning listening skill development	Study effects on mobile app	0.189	0.061	3.103	0.00

The results of the structural or route analysis that were described before provide a more sophisticated understanding of the direct affects of key independent variables on the development of English listening abilities. These findings give more solid evidence of causal links than the findings of simple correlation or regression. The findings unequivocally demonstrate that all three independent variables, the impact of mobile applications, the role of the rural educational environment, and the study effects on mobile applications, exert statistically significant positive effects on the dependent variable. This is demonstrated by fact that each of 3 independent variables has a p-value of 0.00. The fact that each of these criteria contributes considerably and independently to the improvement of students' hearing capacity growth in English supports the assertion that each of these parameters is important.

It has been shown that the educational environment in rural areas is the most important predictor, with the critical ratio (C.R.) of 6.727 & maximum estimated value of 0.429. This indicates that there is a significant beneficial influence as well as a high degree of statistical reliability. The magnitude of coefficient suggests that developments in educational environment of rural areas, like the developments in infrastructure, availability to learning resources, supportive teaching approaches, and digital technologies inclusion, significantly increase listening abilities of students. A higher C.R. was found. The value provides support for confidence that is placed in this link, indicating that influence is consistent and very unlikely to have been result of coincidence. The significance of contextual and environmental support systems in determining outcomes of effective language learning is highlighted by this research.

With the estimate of 0.312 & coefficient of determination (C.R.), mobile applications impact reveals the strong and statistically significant favorable effect on strengthening of listening abilities. 5.894. This suggests that mobile applications acts as the substantial technological facilitator in learning process, and it improves the development of listening capacities while also facilitating learning process. There is little question that availability of audio-visual materials, interactive exercises, and customizable learning alternatives by the mobile platforms increases level of engagement and comprehension among students. In comparison, C.R. was much higher. In modern educational settings, value indicates that this relationship is trustworthy and robust, highlighting increasing relevance of mobile-based learning helps in the educational landscape.

With coefficient of determination (C.R.) of 0.189, findings of the study on mobile applications have statistically significant positive effect, despite fact that estimate is slightly lower than actual value. (3.103). This indicates that manner in which students uses the mobile applications for learning purpose is key contributor to development of their listening abilities. This effect importance implies that purposeful and successful contact with mobile learning aids increases learning outcomes. This is case In spite fact that intensity of this influence is lower in comparison to the magnitude of other 2 factors. It seems to imply that mobile applications availability, as well as quality and frequency with which they are utilized, all contribute to development of language proficiency.

According to results, there is the coherent and convincing narrative which defines how the environmental and technological components work together to increase the English listening abilities. The significant impact of rural educational environment, followed by the mobile applications effect, and then study-related usage patterns, show the stratified effect in which foundational support systems and enabling technology combines to provide the optimal learning outcomes. This effect is indicative of the stratified effect. These findings highlights the need of adopting an all-encompassing strategy for education, one that involves promotion of effective uses of digital tools in conjunction with upgrading of learning environments and infrastructure in a way to increase the students' language skills.

CONFLICT OF INTERESTS

None.

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