

**Exploring the Impact of Technology Enhanced Learning on EAL
Learning in Mathematics, English and Modern Foreign Languages
within a Secondary Education State School**

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A thesis submitted in partial fulfilment of the requirements of the University of
Greenwich for the Degree of Doctor in Education

March 2016

DECLARATION

“I certify that the work contained in this thesis, or any part of it, has not been accepted in substance for any previous degree awarded to me, and is not concurrently being submitted for any degree other than that of Doctor in Education being studied at the University of Greenwich. I also declare that this work is the result of my own investigations, except where otherwise identified by references and that the contents are not the outcome of any form of research misconduct.”

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ACKNOWLEDGEMENTS

It has been a long, challenging, daunting journey but worth every step! A journey filled with twists, bumps, stops and starts that has moulded me. I could not have completed this thesis without the support, relentless promptings, pushes, motivational supervision and guidance of two incredible expert supervisors. My supervisors believed in me more than I did in myself and took me back to the drawing board of re-writing with patience on numerous occasions. The care and concern showed just to keep me when I felt like throwing in the towel and quitting will remain etched in my memory.

Dr Priti Chopra and William Goddard, no words can express my profound gratitude.

To the supportive EdD Team, and the incredible Shirley Leathers: thank you for all the help and constant support to ensure I stayed on the programme to the very end.

I am grateful to my family for all your patience and all that you had to endure in my quest to complete this journey, thank you for your support.

In loving memory of the twins, I did complete the study.

ABSTRACT

The increasing number of English as an Additional Language (EAL) learners in schools has highlighted the need to explore and develop support provision that enhances educational achievement and attainment. One of the approaches that may contribute to supporting EAL learners involves the use of technology-enhanced learning (TEL) in the classroom. The effects of TEL have been disputed among researchers, as some indicate its positive impact, while others offer strict words of caution. This research study explores the potential beneficial impact of TEL on EAL learners' attainment in three subject areas: mathematics, English and modern foreign languages within a comprehensive single-sex state secondary school located in the London Borough of Islington. Through a mixed-methods approach using questionnaires, focus group discussion, classroom observations, and evaluative testing. This research identifies and examines the TEL strategies that teachers use in the classroom and the perceived benefits of EAL learners using TEL. The pragmatic paradigm informs the ontology, epistemology and the methodology of the study as the study aims to explore the hypothesis that there may be potential benefits in using TEL with EAL learners. Analysis of findings demonstrates the positive impact on EAL learners engagement and attainment of learning. It: 1) examines the impact of TEL on teaching/learning in the three mentioned subject areas and; 2) explores how TEL may be used to engage EAL learners effectively. The research revealed that TEL teaching/learning strategies for having a beneficial impact on EAL learners varied across the three subject areas. Nevertheless, in all three subject areas teachers suggested that their selected approach appealed for a variety of reasons. Findings also indicate positive responses from learners. While these findings reinforce a positive association between TEL and EAL teaching and learning practice, within the secondary school classroom, more research with a larger sample size may further contribute to this area of study.

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GLOSSARY

ACTFL	American Council on the Teaching of Foreign Languages
ALM	Audiolingual Method
BECTA	British Education Communications Technology Agency
BICS	Basic Interpersonal Communicative Skills
BME	Black Minority Ethnic
CALL	Computer Assisted Language Learning
CALP	Cognitive Academic Learning Proficiency
CBI	Computer Based Instruction
CLA	Collegiate Learning Assessment
CLT	Communicative Language Teaching
CLIL	Content and Language Integrated Learning
CDP	Career Development Program
DGBL	Digital Games-Based Learning
DfE	Department for Education (UK)
DfEE	Department for Employment and Education (now Department for Work and Pensions UK)
DfES	Department for Education and Skills (formerly DFEE; UK)
EAL	English as an Additional Language
EMAG	Ethnic Minority Achievement Grant
EMASS	Ethnic Minority Achievement Support Service (UK)
GALL	Google-assisted language learning
GCSE	General Certificate of Secondary Education (UK)
HMI	Her Majesty's Inspectorate
IBLL	Internet-based Language Learning
ICT	Information Communication Technology
L1	First Language
L2	Second Language
LCL	Learner Centred learning
MALL	Mobile-assisted Language Learning
MFL	Modern foreign languages
NALDIC	National Association for Language Development in the Curriculum

(UK)

NERF	National Educational Research Forum
NQT	Newly Qualified Teacher
OFSTED	Office for Standards in Education (UK)
OLL	Online Language Learning
PBL	Problem-Based Learning
PISA	Programme for International Student Assessment
SCL	Student Centred Learning
SCT	Socio-cultural theory
SEP	School English Programme
TBI	Task Based Instruction
TBL	Task Based Learning
TBLL	Task Based Language Learning
TBLT	Task Based Language Teaching
TEL	Technology Enhanced Learning
TES	Times Educational Supplement
TPR	Total Physical Response
TTA	Teacher Training Agency
ZPD	Zone of Proximal Development

CHAPTER 1 - INTRODUCTION

1.1 Introduction

The number of children entering British schools and learning English as an additional language (EAL) is increasing (National Association for Language Development in the Curriculum (NALDIC), 2010; Arnot, 2014). One in six primary school pupils in England, or 577,555 learners, do not have English as their first language (Goepel et al., 2015). This figure has doubled since 1997 (Department for Education (DfE), 2012; NALDIC, 2012). More than one million children in all state-funded schools speak English as an additional language. About 360 first languages are spoken among them (Arnot, 2014). Support issues for EAL students who are in the early stages of language acquisition and are being taught in state schools require further research in the UK context (Wardman and York, 2012).

Some research studies suggest that EAL learners' attainment is not equal to that of their fluent English-speaking peers (Franson, 1999; Cameron, 2004). Fluency and proficiency in English distinguish these two groups (Echevarria et al., 2000; Cameron, 2003). Thus, proficiency in English might present a barrier to the academic performance of EAL learners (Leung, 2001; Conteh-Morgan, 2002). Literature suggests that EAL learners must not only improve their English-language proficiency but also be competent in English for academic purposes (EAP) (Cameron, 2003; Barwell, 2005; Cummins, 2005). Researchers have discussed various challenges encountered by EAL learners in achieving learning outcomes (Gomez and Collier, 1987; Cummins, 2003). Technology-enhanced learning (TEL), used consistently as a support tool, may positively impact EAL learner attainment and academic progress (Cummins, 2005; Blatchford et al., 2011).

Hence this study explores the impact of the use of TEL on EAL learning in a state-education secondary school.

1.2 Aims and objectives

The aim of this study is to explore the impact of a structured and consistent use of TEL in the teaching and learning of English, mathematics and modern foreign languages (MFL) for EAL learners. The research aims to investigate how secondary-school teachers incorporate TEL into everyday classroom practice and curriculum delivery in a structured and consistent manner, in the above-mentioned subject areas. Consistent with this aim, the research objectives are to investigate:

- 1) whether TEL practices in the classroom benefit EAL learners;
- 2) the types of TEL approaches, methods and resources that teachers incorporate in their teaching and learning practice; and
- 3) how EAL learners engage with and respond to TEL pedagogical approaches and instructional strategies, and whether such engagement may enhance attainment.

1.3 Research questions

A considerable number of researchers contend that the application of TEL in teaching and learning has a significant positive impact on attainment and enhances learning. However, others dispute these findings (Beeland, 2002; Wang, 2005; Keppell et al., 2006; Lui, Moore Graham and Lee, 2006). For instance, Ringstaff and Kelly (2002) and Piccoli (2001) claim that such findings are inconclusive because of methodological concerns. Some studies further contend that it is not the application of TEL that improves results, but its combination with other variables such as the teacher's pedagogical approach (Kennewell, 2001; Watson, 2001).

This study examines what potential benefits EAL learners may gain from the consistent and structured use of TEL in English, mathematics and MFL lessons. Studying the role that TEL plays in enhancing learning may contribute to EAL attainment. Three exploratory questions frame the various strands that connect back to the central focus of this research study.

1). 'What are the TEL strategies that teachers use to benefit EAL learners in their teaching of English, mathematics and MFL?' This query seeks to ascertain teachers' pedagogical approaches and instructional practices. It considers the types of TEL methods and resources that teachers use.

2). 'How does the use of TEL practices benefit EAL learners in attainment and improve exam results in English, mathematics and MFL?' This question aims to establish whether the structured and consistent use of TEL positively impacts EAL learner attainment in exam results.

3). 'How do EAL learners assess the benefits of TEL?' This considers the benefits of TEL from the perspective of learners. It contributes to a more in-depth qualitative research-based understanding of the benefits of TEL for EAL learners in accordance with an explanatory sequential research design and fitting within a pragmatic paradigm.

1.4 Research context

The research was conducted in a large, state-funded boys' secondary school named Faith Valley School (pseudonym), in the London Borough of Islington. There were 1,023 pupils aged 11 to 19 years of age enrolled in this school.

1.4.1 The London Borough of Islington

The London Borough of Islington is appropriate for the study for a variety of reasons. Islington has one of London's largest EAL-learner populations. It also has more ethnic and language diversity among its pupils than the national average (London Borough of Islington, 2011). In England, on average, 16 per cent of primary school pupils are EAL learners, while in London primary schools the figure is 44.6 per cent (D' Angelo et al., 2011). For secondary schools, the average for EAL learners in England is 11.6 per cent, whereas in London the average is 36.3 per cent (NALDIC, 2012). In Islington, 51 per cent of secondary school learners have an EAL background. Approximately 43 per cent of primary school children and 45 per cent of secondary children, who attend schools in Islington, speak a language other than English as their first language (Islington Annual Report, 2016).

1.4.2 Faith Valley School

Faith Valley School is a larger than average secondary school. It was selected for this study because of its location in Islington. It is also the school at which the author of this thesis works. Its EAL population is high, the majority of learners are from low-income backgrounds and they are eligible for free school meals. The proportion of learners from ethnic minority backgrounds is greater than the national average, as is, most importantly, the number of learners who do not have English as their first language (Ofsted Report, 2012). Prior to 2008, teachers used TEL sporadically and in very few subjects. Equipment related to information technology (ICT) was not used as a teaching or facilitating tool, but rather for administrative tasks. Teachers mostly used TEL for routine functions such as record-keeping, lesson-plan development, information presentation and basic information searches on the internet. In 2013, 52.6 per cent of EAL learners achieved grade C or above in English in their General Certificate of Secondary Education (GCSE) examinations, compared with 69.7 per cent of their monolingual peers (GCSE Trend Analysis, 2015).

Of EAL learners, 70.2 per cent achieved a GCSE A*-C pass in mathematics, compared with 75.1 per cent of learners with English as their first language. EAL learners scored slightly better than their peers in MFL (45.4 per cent of EAL learners gained a GCSE A*-C pass compared with 33.5 per cent for learners with English as a first language).

However, their overall GCSE results in five subjects at A*-C, including mathematics and English, was 55.2 per cent, compared with English as a first language learners' overall result of 61.7 per cent (Appendix J).

According to the school's 2012 Ofsted report, Faith Valley School has achieved and exceeded government standards, which set the minimum expectations for attainment and progress. The school has earned various awards, including the Leading Aspect Award for its successful promotion of a positive learning environment (Ofsted Report, 2012, Appendix I). At the outset of this study, the school had gained specialist status in mathematics, and information and communication technology, thereby becoming a specialist mathematics and ICT college. The school is known for its constructive learning environment, which strives to facilitate academic excellence and support the achievement of EAL learners.

As an ICT specialist college and a beneficiary of the UK government's Building Schools for the Future (BSF) investment programme, the school has embraced the use of TEL, investing in ICT infrastructure, hardware, software, teaching and learning resources, and incorporating TEL practices in three specific subjects: English, mathematics and MFL. English was chosen because EAL and special educational needs (SEN) learners have struggled to excel in this subject. Mathematics was selected because of the school's status as a specialist mathematics college. MFL was identified because every student is expected to learn a MFL, and this has been a challenging area in which to meet the government-set attainment standards based on the new Progress 8 and Attainment 8 measures in the GCSE league tables. Under the new educational initiative prescribed by the government, these three subjects are mandatory and contribute to overall GCSE achievement (DfE, 2016; NCFE, 2016; Whittaker and Dickins, 2016). Over the last six years, EAL learners' attainment in these subjects has been lower than that of their peers who speak English as a first language (GCSE Trend Analysis 2012, Appendix J).

Despite Faith Valley learners achieving results that have met government standards, the attainment of the school's EAL learners needs to be addressed. The Ofsted report (2012, p5) states: 'Much remains to be done to support EAL achievement as learners are not making comparable progress in attainment as their monolingual counterparts.' At the outset of this research study, the Ofsted inspectors had recommended the

incorporation of TEL in classroom teaching/learning in order to improve the attainment and academic achievements of EAL learners, as very little had been done in this respect. The Ofsted observations and recommendations noted that:

- Very little technology is adopted and incorporated in teaching and learning, especially in the case of vulnerable groups (EAL and SEN).
- Great care is to be taken to introduce TEL into as many EAL lessons as possible, ensuring excellent application of these skills.
- EAL and SEN learners must receive the support they need to do as well as their peers.
- Teachers need to adjust materials and activities incorporating TEL activities and modes of instruction so that they match learners' needs.
- High levels of scaffolding using TEL and appropriate pedagogies will enable learners of varying EAL abilities to make outstanding progress. (See Appendix I: Ofsted Report, 2012).

1.5 Professional context and background

At an early stage of deliberations over the nature and purpose of this study, I found it hard to separate myself from a discussion firmly rooted in EAL attainment, and specifically, on the difference between the GCSE results in English of EAL learners and their peers who have English as a first language.

As a secondary school teacher with 16 years' experience as a subject leader in ICT and computing, I am aware that ensuring annual improvement in GCSE grades, especially for EAL learners, is a significant challenge. There were many difficult questions regarding the use of appropriate pedagogy and teaching/learning tools to improve the attainment of EAL learners.

I found myself increasingly engaged in discussions, events and conferences, trying to identify effective teaching strategies with which to enhance EAL achievement and attainment. My professional development has involved learning about EAL attainment in English schools. In my subject area, I continually search for ways to help EAL learners to improve their GCSE grades. This search has shaped my understanding of the nature of EAL achievement and furnished me with insight into the meaning of EAL underachievement. It has heightened my interest in EAL learning and support strategies to improve learners' academic standards.

I began working in this field in 2001, when political conversations about EAL learning were gaining impetus under the 'value-added' measurement of school effectiveness. Working with talented, intelligent, young learners who communicated and learned differently to others enriched my understanding of the challenges they experienced. I observed that the meaning of educational attainment for these learners was not always the same as that defined by the school. I was aware that the school's perception was somewhat removed from the experiences of these young people, particularly in subjects such as mathematics, English and MFL.

As an ICT teacher in an inner London secondary school, teaching mixed-ability students and EAL learners, I have witnessed first-hand the difficulties that EAL learners experience in their attempts to access the curriculum. Studying in a language which is not one's mother tongue is widely recognised as challenging (Watt, 2001; Delli Carpini, 2008; Oleck, 2008). EAL learners are expected to perform as well, academically, as their peers who are fluent in English (Department for Education and Skills (DfES), 2002; NALDIC, 2002; Reed, 2012). I was the principal applicant in the bid for Faith Valley School to become a specialist ICT college, and wanted to explore the impact and potential benefits of TEL on EAL learners in the three above-mentioned subject areas. This was a new area of research within the school context.

My professional role as ICT subject leader, line-manager and school ICT coordinator, responsible for ensuring that TEL practices are incorporated into the three subjects across the school, complicates my position as a researcher exploring the impact of TEL on EAL learners within the same context. In my professional role, I also support teachers in identifying effective strategies to deliver the curriculum content, in a way that makes it accessible to EAL learners and enhances their attainment. In my professional role, therefore, I am well known to the research participants.

This raises the issue of power relations; for example, the probability of research participants providing the researcher with the responses that they think the researcher requires (Bonner and Tolhurst, 2002). I incorporated method- and data-triangulation to address this. I also ensured that questionnaires were anonymous; that participants were assured that their names and identities would not be revealed, and that their confidentiality would be protected. The purpose of the study was explained to participants, who were assured that they could withdraw at any time (Hill, 2005).

1.6 Characteristics and identity of EAL learners in the study

EAL acquisition consists of several stages. Different strategies are required at each stage to achieve the best learning outcomes (Krashen, 1981; Cummins, 2012; Demie, 2012). Cummins (2012) categorises the stages as:

Stage 1 – beginner, up to approximately a year and a half of learning

Stage 2 – becoming familiar with English, after approximately two years

Stage 3 – becoming confident in English, after approximately two-and-a-half years

Stage 4 – fully fluent

The DfES report (2007) outlines different EAL learner stages, using early and advanced definitions to separate the stages that a student has reached. In the current study, I refer to learners with little or no English as ‘early EAL learners’ and those who have been exposed to English but who require support to reach an academic level as ‘advanced EAL learners’.

EAL learners can also be categorised in a way that considers their stage of English-language acquisition regarding the impact on their learning and the strategies used in teaching them (Bialystok and Miller, 2001). They can be grouped into four stages of language acquisition (Bialystok and Miller, 2001; Demie, 2011). The first two phases cover learners in the early stages of learning English. Stage one is the ‘new to English’ stage: EAL learners who may have recently arrived in the UK with little understanding or no English proficiency, who need support to operate in English in order to engage in activities using their mother tongue (Bialystock and Miller, 2001; Arnot, 2012). Stage two of English-language acquisition is the ‘becoming familiar with English’ phase (Bialystock and Miller, 2001). The spoken English of these EAL learners typically is well developed, but their literacy levels lead them to require considerable assistance to operate successfully in written activities. The third stage represents a more advanced level of language development, the ‘becoming confident as a user of English’ stage (Bialystock and Miller 2001). EAL learners in this phase may have been learning English for several years. They may be fluent speakers, able to engage in both oral and written tasks and to do well in the English subject, the humanities and other subjects requiring a good knowledge of the language but, even so, requiring further support in order to succeed in mathematics and science (Bialystok and Miller, 2001; Demie, 2011). These learners may have difficulty when using age-appropriate, curriculum-related vocabulary and forming grammatically correct sentences (Demie, 2011). The last group comprises expert speakers, readers and writers of their first languages and English (Bialystok and Miller, 2001; Demie, 2011).

EAL learners who enter schools across England may rapidly develop fluent conversational skills in English, known as basic interpersonal communicative skills (BICS) (Cummins, 2002). However, their cognitive academic-language proficiency (CALP) – that is, their academic skills – may persistently lag behind those of their fluent peers at the same academic stage of school, and for them to engage academically at the appropriate level may take several years or more (Cummins, 2002). These learners may further have unique needs owing to diverse social and cultural backgrounds and different understandings and expectations of learning (NALDIC, 1999).

A variety of learning variables, such as culture, language, religion and ethnicity, influences the learning context, which can impact on how learners perform academically in school as they grapple with two main learning tasks in the school context: learning English, and learning the content of the curriculum (Arnot, 2014). Learning English alongside the curriculum is no easy task for EAL learners; it requires perseverance and focused learning strategies. Some learners find this too daunting; they give up and withdraw from academic pursuits (Cummins, 2002). Compared with fluent English speakers, EAL learners are sometimes perceived as lazy because teachers do not realise that they are encountering legitimate problems related to English proficiency for academic purposes (Susanna, 2007; Murray and Christison, 2010; John and Ehow, 2011).

EAL learners selected for this study were at different stages of language acquisition. The chosen sample ranged from learners at the beginning stages of acquiring English to those proficient in spoken English but struggling with the language for academic purposes (DfES, 2007; Demie, 2012). Thus, beginner, intermediate and advanced EAL learners were recruited for the study. Beginner learners were at an early stage of acquiring English. Their relative proficiency depended upon their educational background and the support they received (Krashen, 1981; DfES, 2007; Demie, 2012). Intermediate learners had been studying English for between two and five years (Demie, 2012; DfE, 2012). Advanced learners had received all or most of their school education in the UK, and their oral proficiency in English was typically indistinguishable from that of pupils with English as their first language (Demie, 2012). Their writing, however, exhibited features unique to their language background (Cummins, 2009).

1.7 Importance of TEL and rationale for exploring benefits on EAL learner attainment

Technology has infiltrated every aspect of our lives, communities and homes. Correctly used, technology has the potential to help learners survive in a complex, highly technological, knowledge-based economy (Canough, 2013).

Incorporating TEL into mathematics, English and MFL lessons supports four critical areas of learning: active engagement; involvement in groups; regular collaboration and feedback; and links to real-world experts (Edutopia, 2008; Cheung, 2011). Learning through projects when they are equipped with technological tools allows learners to be intellectually challenged while being provided with the subject knowledge required (Edutopia, 2008). Through projects, learners can acquire and refine their analysis and problem-solving skills as they work individually and in teams to find, process and synthesise the information they have found online (Buck, 2013).

Multiple online resources provide each learning environment with more interesting, diverse and current learning materials (Jothi, 2013). The internet connects learners to experts in the real world and provides numerous opportunities for expressing understanding through images, sound and text (Jothi, 2013). New technological tools for visualising and modelling, especially in the sciences, offer ways for students to experiment and observe phenomena, as well as to view results graphically, which enhances understanding (Jothi, 2013). In addition, with technological tools and a project-learning approach, learners are more likely to stay engaged and on task, reducing behavioural problems in the classroom (Becta, 2008; Edutopia, 2008).

Technology has also been identified as a tool that changes the way teachers teach, offering educators effective ways to reach different types of learners and to assess student understanding (Hirumi, 2012). It also enhances the relationship between teacher and learner. When technology is integrated effectively into subject areas, teachers grow into the roles of adviser, content expert and coach (Edutopia, 2008; Grant and Basye, 2014; Henson, 2015). Technology makes teaching and learning more meaningful and fun. The use of technology can facilitate curriculum flexibility, motivating learners and encouraging achievement (Heafner, 2004).

As a teacher, I have struggled to find effective strategies to teach EAL learners. I have realised that there is a need for better understanding of TEL, attainment, language acquisition, learner identities and other issues that influence the learning ability of EAL students (Malarz, 2016).

Previous research has concentrated largely on how to help EAL learners improve academically, especially to improve their examination results (Collier and Thomas, 2002; NALDIC, 2007; the Organisation for Economic Cooperation and Development (OECD), 2010; the Association of Independent Professionals and the Self-Employed (IPSE), 2012; Amot, 2014). The focus has also been on identifying ways to incorporate TEL strategies into traditional teaching practices (Dudeney and Hockly, 2012; Stanley, 2013). Some literature also highlights the need to build capacity to improve teaching practices and further develop strategies to support EAL learners (Gibbons, 2002; Zhang, 2008). The academic capabilities of EAL learners have been shaped by teacher-selected teaching methods (Barwell, 2005). However, teachers and educational institutions may perceive EAL learners as inherently lacking and adhere to the 'deficit model' when teaching them (Donna and Spooner-Lane, 2008; Tangen, 2012). In the deficit model, the underachievement of EAL learners may be attributed to their shortcomings in English (Conteh et al., 2007; Flynn, 2007). The students' lack of social capital absolves society and the structure of the education system from responsibility for their underachievement (Goldenberg et al., 2006; Cramer and Sturges, 2007; Harry and Klingner, 2007). Such perceptions may hinder the development of teaching approaches for EAL learners through TEL strategies and resources that benefit them (Tangen and Spooner-Lane, 2008).

The current study builds on previous research to explore the impact of TEL on EAL learning in English, mathematics and MFL and the circumstances under which TEL practices may help EAL learners (Low and Beverton, 2004). TEL may create further possibilities for enhancing the academic attainment of EAL learners in secondary schools (Dreyer, 2003; Yang, 2006; Warschauer and Healey, 2013).

Existing studies on the impact of TEL on EAL learners have yielded conflicting findings (Parr and Fung, 2000; Andrews et al., 2002; Harley 2007; Zhoa, 2013; Shuib and Azizan, 2015). There is thus a need for accurate assessment of this impact, which the current study hopes to explore. In a review of data from an extensive sizeable national survey of information technology (IT) in schools, Vollmer (2000) argued that the usefulness of technology in schools and its positive effect on learners was questionable. Referring to a study assessing the viability of TEL techniques in the learning outcome of EAL learners with specific characteristics in a selected school, Vollmer noted that the results of including TEL in teaching practices was difficult to evaluate accurately.

Larry (2001) further pointed out that the use of computers and other technological advances in teaching methods, although useful, did not produce any significant results in learners' performance. In a study assessing the impact of computers on the learning practices of students in schools, Larry reported extensive integration between the two when learners were taught using computers and other modern techniques. However, at every level, Larry found unexpected results, with no clear and substantial evidence of learners increasing their academic attainment as a result of TEL. Cuban (2009) also found that the problem was not with access to TEL and other technological resources, as learners who showed poor academic performance had access to approximately the same technological resources as their more successful peers.

Cuban (2009) attributed this to the 'blame and train' approach used by most technophobic teachers to establish their arguments. Other research performed in the field relied on teachers who were less resistant to using technological resources to prepare their work and to liaise with parents, colleagues and learners (Cox, 2000; Jones, 2004). The technology in these studies was also used to keep records and conduct research studies. However, Wang (2012: 133) stated: 'less than five per cent of teachers integrated computer technology into their curriculum and instructional routines'. Technology was not well incorporated into the study of English as an additional language (EAL) due to the de-trended pattern of technology use in schools. In fact, 'the overwhelming majority of teachers employed the technology to sustain existing patterns of teaching rather than to innovate' (Wang, 2012: 134).

In another study, Walqui (2000) discussed negative aspects associated with TEL, especially with computers, in schools or other learning practices. His findings enforced concerns that too much cyber-time negatively affected learners. Walqui (2000) highlighted a large international study by Fuchs and Woessmann (2004) on extensive computer use in schools. These researchers analysed the outcome of the OECD's Programme for International Student Assessment (PISA) standardised tests. The sample consisted of 174,000 15-year-old learners in reading and 97,000 each in mathematics and science from 31 countries. Confounding variables were controlled. Their findings confirmed what many parents had long intuited: that the sheer ubiquity of information technology was interfering with learning (Martin, 2009; Cullingford and Hag, 2016). The findings of this study are influencing pedagogy now.

In her 2005 article 'Is technology in schools the future or just a fad?', Hetzner (2005) discussed the uncertainty regarding whether computers improved academic performance. Oppenheimer (2003) shared this perspective and provided further arguments against TEL in EAL education. Oppenheimer concluded that the use of technology in schools did not aid learners, but instead wasted resources. The results also suggested that the emphasis on keeping schools up to date with the latest technology was misplaced and had no impact on academic performance (OECD, 2015).

These different perspectives and inconclusive results warrant an exploration of the impact of TEL on EAL learning in English, mathematics and MFL to consider whether TEL practices in the classroom are beneficial to EAL learners.

1.8 Rationale

According to Sood and Mistry (2001), the number of learners with EAL in schools in England is increasing, primarily because of the influx of migrants from the rest of Europe (Pollard et al., 2008; Reynolds, 2008; Ryan et al., 2008; Van der Aa and Blommaert, 2011). As already mentioned, in the English education system, learners from families with EAL constitute a large section of the school population (Andrews, 2009; Arnot, 2014). More than nine per cent of learners nationwide were identified as having EAL in 2003 (DfES, 2003), while in 2005 Roberts (2005) estimated the number of EAL learners in the UK at approximately 700,000, which constituted more than 10 per cent of the school population (Ofsted, 2005). Research has also revealed that the variety of learners in London schools makes it the world's most linguistically diverse city, in which more than 300 languages are spoken (NALDIC, 2008; Strand et al., 2015).

Almost half the state-school learners in London speak languages other than English. For instance, the National Centre for Languages reported on 14 December 2010 that 41 per cent of state-school learners in London spoke other languages (Davis, 2010; Wyness, 2011). Figures collected in January 2011 by the DfE indicated that the proficiency of learners in primary schools who came from diverse ethnic-minority backgrounds and had little knowledge of English had increased from 21.9 per cent to 26.9 per cent since 2006 (DfE, 2011). The results of the 2012 school census indicated that the number of EAL learners in state schools in England had reached one million (School Level Annual School Census (SLASC), 2011; NALDIC, 2013). Further research shows positive achievements for EAL learners whose linguistic backgrounds were correctly analysed and who were helped accordingly (DfE, 2002; Franson, 2002). Despite such evidence, two-thirds of schools were reported to underestimate the complexity of language used in examinations and failed to recognise that EAL learners needed simultaneously to develop and demonstrate predictive, analytical and lateral thinking skills in English to be successful (Valdes, 2001).

Policy documents such as the Swann Report (1985) paved the way for EAL learners to be taught alongside their fluent English peers in schools while learning English through the curriculum (Leung and Franson, 2001). The intention was to provide equal access to education for EAL learners in schools, providing them with an equal opportunity to progress (Leung, 2007). However, Leung's view is that the national curriculum (NC) is structured in such a way that learners must build and consolidate knowledge based on previous learning experiences and that this impedes their progress and negatively impacts their attainment (Leung, 2009; NALDIC, 2012).

Cummins (2002) supports this assertion, proving its validity using the BICS and CALP models to explain why the needs of the EAL learner should be considered during school teaching. The BICS and CALP models take account of the length of time it takes EAL learners to acquire communicative and language proficiency skills. To learn basic communication skills requires about two years, and proficiency in academic language needs a further five to seven years of learning (Cummins, 2002). To be able to access the NC confidently, learners must possess CALP. NALDIC (2011) advocates that the needs of EAL learners should be taken into account when they are taught in schools, and highlights the need for learners to strengthen both cultural awareness and communication practices while pursuing their education, as advocated by sociocultural and constructive theorists (e.g. Vygotsky, 1978).

Despite the valuable move advocated by the Swann Report (1985), EAL support has not been given subject status in the NC (Leung, 2001). Swann said that any additional needs of EAL learners should be met in the mainstream classroom and that this should be done preferably through collaborative accessing, planning and partnership teaching (by specialist and classroom teachers working together). The report also affirmed that all learners by law should have full access to the national curriculum. It was also stated that pupils in the early stages of learning English should be supported (DfES, 2003) and assessed up to level two of the subject in the national curriculum (King, 2017). No specific policy or policy prescriptions have been introduced on EAL and how it should be taught in schools. The recent update in 2012 focused explicitly on EAL teaching and learning for the first time, although EAL still lacks subject status in the NC (Gibbons, 2002). The current policy aims to ensure rapid language acquisition and strengthen inclusivity for EAL learners (Gibbons, 2002).

Current policies and the role of teachers to support EAL learners have not been adequately emphasised (Leung, 2005). The majority of schools and academic institutions have perceptions about how EAL learners should be instructed and such perceptions sometimes contradict one another (Bonny and Toohey, 2009). United and rigorous focus on the issue may lead to a policy initiative to engage and enhance learning outcomes for EAL learners. The perceptions and attitudes of teachers in this regard are that policy should focus on this issue (Siwatu 2007; Mollaei and Riasati, 2013).

1.9 Professional issues and TEL concerns

Professionally there are challenges and concerns regarding the exploration of the impact of classroom TEL practices on EAL learning (Kirkwoo, 2011; Arnot, 2014). These can potentially introduce bias, skewing the findings of a study. They include matters of pedagogical practice as opposed to technical skills, teachers' ICT competence, computer self-efficacy, teaching experience, teacher workload, institutional characteristics, accessibility, and technical and leadership support. Other concerns include whole school support, loss of control of learning, and scarcity of resources.

1.9.1 ICT competence

In the current research, the competence of teachers in ICT is a concern. Computer competence is the ability to handle a broad range of different computer applications for various purposes (van Braak et al., 2004). According to Berner (2003), Na (1993) and Summers (1990) as cited in Bordbar (2010), the computer competence of teachers is a significant predictor of successful TEL integration into teaching. Evidence suggests that the majority of teachers who report a negative or neutral attitude towards integrating TEL into teaching and learning processes lack the knowledge and skills to make 'informed decisions' (Al-Oteawi, 2002: 253). In a qualitative case study in five European countries of the competence and confidence of primary school teachers regarding using TEL in teaching practice, expertise was found to influence how teachers used technology in teaching (Peralta and Costata, 2007). According to Peralta and Costata (2007), teachers who are experienced with computers have greater confidence in their ability to use them effectively. Teacher competence relates

directly to confidence (Jones, 2004). Teachers' confidence also relates to their perception of their capacity to use computers in the classroom, particularly in light of the perceived competence of their learners (Bordbar, 2010).

Another concern is the computer self-efficacy of teachers, which is a judgment of their capability to use a computer (Compeau and Higgins, 1995; Bandura, 1997). Teacher confidence refers both to their perceived likelihood of success using TEL for educational purposes, and to the extent to which the teachers perceive success as under their control (Christensen and Knezek, 2006; Peralta and Costata, 2007). It has been established that teachers' computer self-efficacy influences how they use TEL in teaching and learning (Knezek and Christensen, 2002; Liaw et al., 2007; Yuen and Ma, 2008).

As mentioned above, Peralta and Costata (2007) conducted a study on the competencies and confidence of 20 teachers in using TEL in classrooms. They found that teacher expertise with technology was a factor in improving confidence in TEL use. Pedagogical and personal factors were found to be most likely to contribute to TEL confidence. Perceived confidence in TEL use was also associated with decreased fear of controlling or damaging the computer. This issue could be addressed by affording teachers time to work with and use TEL, gain support from experienced teachers and train in conditions favourable to gaining confidence in TEL use.

Teachers are reluctant to use a computer if they lack confidence (Jones, 2004). 'Fear of failure' and 'lack of ICT knowledge' (Balanskat et al., 2006) have been cited as some of the reasons why teachers lack confidence in adopting and integrating ICT into their teaching. In one survey, approximately 21 per cent of teachers reported that lack of confidence influenced how they used computers in their classrooms: 'Many teachers who do not consider themselves to be well skilled in using TEL feel anxious about using it in front of a class of learners who perhaps know more than they do' (Becta, 2001: 7).

1.9.2 Teacher workload

Teacher workload is another potential issue in the current work. Many studies have revealed that the workloads of teachers influence the extent to which they accept technology in classrooms. For example, in a study of factors related to the use of learning management systems at a large multi-campus urban university in Australia, participants reported that increased workload critically affected teaching with technology (Samarawickrema and Stacey, 2007). Factors contributing to increased workload include course maintenance and constant upgrades, student emails, the learning of new skills and the continual search for sustainable strategies (Fullan, 2003; Abuhmaid, 2011; Neyland, 2011).

Neyland and Abuhmaih (2011) conducted research into factors influencing the integration of online learning in Sydney and Jordan high schools, respectively. In interviews, teachers reported their workload as alarming. Asking teachers to integrate an additional task into a full curriculum overstretched the resources they had. Some teachers argued that they were already so overloaded that they could not cope with the pressure, including that of TEL training. Fullan (2003) suggests that, for teachers to realise the aims of the educational system and to implement new initiatives, their workload must be decreased.

1.9.3 Professional development

In this study, teacher expertise in TEL is a potential issue. This problem could be overcome by management embracing professional development as fundamental to the successful integration of TEL into the teaching and delivery of curriculum content.

Several studies show that TEL-associated training programmes improve teacher proficiency in the use of computers (Bauer and Kenton, 2005; Wozney et al., 2006; Franklin, 2007) and influence their attitudes towards the technology (Hew and Brush, 2007; Keengwe and Onchwari, 2008). Such training also helps teachers to reprioritise technology and establish the significance of new technological tools in student learning (Plair, 2008). Technology training is associated with the successful integration of technology in the classroom (Muller et al., 2008).

In a study of 400 pre-university teachers, successful TEL integration was most significantly determined by professional development, continuing support of good practice and teacher technology skills (Sandholtz and Reilly, 2004). However, these conditions do not guarantee efficient use of technology in the classroom. Training programmes focusing on TEL pedagogical training help teachers apply technologies in teaching and learning (Reilly, 2004).

Quality professional training programmes help teachers to implement technology and transform teaching practices (Diehl, 2005; Brinkerhoff, 2006). Training programmes over longer periods, new teaching and learning technologies and the enthusiastic engagement of teachers in activities, all improve teamwork and clarify the vision for learner attainment (Lawless and Pellegrino, 2007). Teachers may adopt and integrate TEL into their teaching when training programmes concentrate on the subject matter, values and technology.

Teachers require experts in technology to instruct them on how to integrate TEL to facilitate student learning (Plair, 2008). The extent to which teachers understand content knowledge and how to apply technology to support student learning and attainment improves their knowledge, confidence and attitudes towards technology. Teachers who integrate technology with new teaching practices gained through professional training can transform learner performance (Wepner et al., 2006; Lawless and Pellegrino, 2007; Chen, 2008).

When given time to practice the technology, teachers learn, share and collaborate with peers and are more likely to integrate the technology into their teaching. Training programmes for teachers that embrace educational practices and strategies to address beliefs, skills and knowledge improve teacher awareness and insights into transforming classroom activities (Levin and Wadmany, 2008).

1.9.4 Accessibility and technical support

Access to ICT infrastructure and resources in schools is a necessary condition for integrating TEL into education (Plomp et al., 2009). In the current study, effective integration of TEL into teaching in schools depends mainly on the availability and accessibility of TEL resources, both hardware and software. Access to computers with

updated software and hardware is a crucial element to integrating technology successfully in the pedagogical use of TEL.

Technical assistance is crucial to the successful implementation of a study (Kennewell, 2004). Computer breakdowns cause interruptions and, if there is no technical help, equipment is not maintained routinely and teachers do not use TEL-related equipment in teaching. Persistent computer breakdowns result in teachers not wanting to use computers owing to fear of equipment failure and technical problems they may be unequipped to handle: 'If there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns' (Kennewell, 2004: 16).

The National Council for Technology in Education (NCTE, 2005) in Ireland conducted a census on ICT infrastructure. About 85 per cent of schools reported technical support and maintenance as a 'high' or 'very high' priority, stating that it should be an essential element of the school ICT environment, with proper technical support made available to maintain hardware and infrastructure. According to a study on technology integration processes in the Turkish education system, schools should be provided with technical support for repair and maintenance of ICT to enhance the delivery of TEL, in addition to equipment and internet connections (Yilmaz, 2011). A lack of technical assistance for teachers frustrates them, so they are unwilling to use TEL (Tong and Trinidad, 2005). Schools in Britain and The Netherlands appreciate the significance of technical support to help teachers integrate technology into their teaching (Korte and Husing, 2007). ICT support in schools improves the way that teachers use TEL in classrooms, removing the need for troubleshooting problems with hardware and software (Cox, 2000).

1.9.5 Leadership support

There is also an acute need for strong leadership and management of school technology (Anderson and Dexte, 2005). A leader who implements technology plans and shares common perceptions with teachers encourages and inspires them to use technology in their lessons (Yee, 2000). Schiff and Solomon (2002) suggest that, for teaching staff to use TEL effectively, strong leadership must drive well-designed technology plans in schools. Lai and Pratt (2004) identify five factors that schools need

for TEL to be properly utilised: TEL resources, TEL teaching, TEL leadership, general good teaching and general purposeful school leadership. Lai and Pratt (2004) indicate that 'as the quality of TEL leadership improves, the percentage of schools providing good quality TEL learning opportunities increases' (Lai and Pratt, 2004: 462).

A study in eight schools in Hong Kong and Singapore revealed that transformational integration of TEL was influenced by leadership promotion of collaboration and experimentation and teachers' dedication to student-centred learning (Wong and Li, 2008). Ng (2008) conducted a quantitative study on aspects of transformational leadership with 80 Singaporean teachers. He similarly discovered that transformational leadership could influence TEL integration. Afshari et al. (2009) distributed questionnaires to 30 heads of secondary schools in Tehran. Their results revealed a relationship between the leader's level of computer competence and transformational leadership practices. They concluded that transformational leadership could help improve TEL integration into teaching and learning. In a case-study of 18 schools in Hong Kong, in catalytic integration model schools, the school principal emerged as the key agent of change (Yuen et al., 2003). A model principal exhibited visionary leadership, involved staff and ensured their career development.

Other research indicates that different levels of leadership, such as the principal, administrative and technology leadership, affect the successful use of TEL in schools (Anderson and Dexter, 2005). Institutions led by executive involvement and decision-making in TEL planning facilitate the effective integration of EAL into the curriculum (Anderson and Dexter, 2005).

1.9.6 Technology-enhanced learning practice

Technological characteristics affect the delivery processes of innovation and critically influence whether and how innovation is adopted. Those adopting an innovation perceive its attributes to include a relative advantage, compatibility, complexity, testability and observability (Rogers, 2003). Such perceptions significantly impact the future use of specific innovations (Rogers, 2003). TEL is a particular kind of instructive innovation (Watson, 2006). According to Groff and Mouza (2008), when teachers integrate TEL into teaching, they operate as innovators. Recent work on this issue includes the study of student perceptions of educational technology in tertiary

education (Parker et al., 2008), perceptions of pre-service teachers and ideas about asynchronous discussion boards (Ajayi, 2009), and teachers' perceptions of learning technologies (Cope and Ward, 2002). This aspect further includes the perceived advantages of the internet to determine its use as a teaching-learning tool (Martins et al., 2004). Observability and testability of its usefulness emerge as the two most important elements (Martins et al., 2004).

A study of teacher adoption of web technology in a secondary school revealed that the relative benefits should be considered by school principals wanting to maximise TEL use in their schools (Jebelie and Reeve, 2003). Perceived usefulness and ease of use can indicate the extent to which users embrace TEL (Smarkola, 2007). In a study of ways in which 700 secondary school teachers in Nigeria used TEL, the majority perceived TEL as very useful and believed that it improved teaching by making learning easier (Tella, 2007).

Similarly, Askar, Usluel and Mumcu (2006) examined the extent to which perceived innovation characteristics were linked with the possibility of task-related TEL use by secondary school teachers in Turkey. A questionnaire was completed by 416 secondary school teachers to determine the task-related uses and teacher perceptions of ICT. The findings indicated that complexity or ease of use was a commonly assumed unique characteristic for teaching and learning delivery, preparation and managerial tasks in schools. Further, observability was a perceived attribute in teaching provision in some individual tasks executed during class time, while relative advantage and compatibility were seen as essential for teaching preparation (Askar, Usluel and Mumcu, 2006).

In another study, a structural-equation modelling technique was used to analyse the impact of technological resources and computer attributes (relative advantage, compatibility, ease of use and observability) on innovative educational and administrative tasks (Usluel et al., 2008). The study involved 834 faculty members from 22 universities in Turkey. They reported that approximately 61 per cent of the variance of ICT use was explained by ICT resources and computer attributes.

Yi et al. (2006) report that relative benefits, complexity, observability and image are the most accurate predictors of student/teacher intentions to use TEL. According to

Dillon and Morris (1996: 6), 'innovations that offer benefits, compatibility with already established norms and beliefs, minimal complexity, potential trial ability and observability will have a more popular and rapid rate of integration'. If teachers perceive TEL as being compatible with their needs, easy to adopt, open to testing before use and supplying noticeable results, they are likely to adopt and integrate it quickly.

Several studies have investigated the factors that constitute barriers to teachers' use of TEL. Balanskat et al. (2006) proposed three categories of factors that prevented teachers from integrating TEL into the system. First, there were teacher-level barriers including lack of teacher TEL expertise, lack of teacher confidence, lack of pedagogical teacher training, and lack of follow-up of new differentiated training programmes. Second, school-level barriers comprised the lack of ICT equipment and old or poorly maintained hardware. This category also included lack of appropriate software; restricted access to ICT; limited project-related experience; and lack of mainstreaming TEL into school strategy. Third, system-level barriers included the rigid structure of traditional education systems, traditional assessment, restrictive curricula and restricted organisational structure.

Another survey of the issues that discouraged teachers from adopting TEL in teaching and learning found that teachers mainly used technology to prepare lesson notes and assessments rather than to improve the academic performance of learners (Yildirim, 2007). Big classes, inadequate training, lack of technical and pedagogical assistance, rigid school syllabi, lack of motivation, weak leadership and poor cooperation among teachers constituted barriers to TEL use. Lack of access, time pressure and lack of mentors and opportunities for training also affect whether teachers use TEL in teaching/learning (Slaouti and Barton, 2007). Chigona et al. (2010) conducted a qualitative study on factors preventing teachers from using TEL in Khanya schools in South Africa. Fourteen teachers from four secondary schools were interviewed. The study found that inadequate training, lack of access to computers, lack of technical support and insufficient technological resources discouraged teachers from using TEL in their teaching. A mixed-methods study of teacher confidence and competence in the use of TEL in teaching, with 20 teachers from Greece, Italy, Spain, Portugal and The Netherlands, revealed that teacher confidence and competence were affected by a lack of time to learn new skills and old TEL equipment (Peralta and Costata, 2007).

Large classes, too few computers, absence of technical and pedagogical assistance and absence of collaboration and cooperation among teachers have been similarly cited as negatively affecting TEL use (Kennewell, 2004).

It was anticipated that various issues would beset the use of TEL in the context of this study. Numerous factors influence whether and how teachers use TEL, including their feelings, knowledge and attitudes. The attitudes of teachers towards technology affect their acceptance of its usefulness and its incorporation into teaching (Huang and Liaw, 2005). If teachers have positive attitudes towards educational technology, they can provide useful insight into adopting and integrating TEL into teaching and learning.

At the school level, support, funding, training and facilities influence whether teachers adopt and integrate technologies into their classrooms. The professional development of teachers is fundamental to the successful integration of computers into classroom teaching. TEL-related training programmes develop teacher competencies in computer use (Bauer and Kenton, 2005; Wozney et al., 2006; Franklin, 2007), which influence their attitudes towards TEL (Keengwe and Onchwari, 2008) and assist them in reconceptualising the significance of technological tools to learning (Plair, 2008).

At the technological level, teachers must perceive a new technology as superior to previous practice, based on existing values, past experiences and needs. It is important that the ease of use of the technology can be tested before deciding whether to use it and that the results of the innovation are visible to others. Teachers may be reluctant to alter existing programmes to something of which they have little understanding; the knowledge they do have may be derived mainly from theory and not practice.

These three characteristics or attributes of how teachers adopt and integrate TEL into teaching illuminate the factors that support and hinder TEL integration. The key element in this study is the attitude of teachers to embracing technology or the intention to use technology in lessons. If teachers have negative attitudes towards technology, offering them excellent facilities might not compel them to use TEL.

The development of the technical skills of teachers may come at the expense of enhancing their pedagogical skills. In a busy school environment, the concern is that teachers will not receive adequate support in selecting and using the appropriate

pedagogical skills for the technology chosen to deliver the content (Plair, 2008).

Most teachers prioritise order in lessons and an organised learning environment. Innovative teaching techniques such as TEL constitute a threat to this orderly pattern and might thus be considered undesirable (Naidum, 2003). A considerable number of teachers in Faith Valley School are sceptical of the value of TEL, which might pose a challenge to the current study.

1.9.7 Participant observer role

I have concerns regarding my role as participant researcher, as well as other biases that might undermine the results. These are legitimate threats to the credibility of the study. The value of empirical research depends largely upon the ability of individual researchers to demonstrate the credibility of their findings (Goetz and LeCompte, 2005). Regardless of the discipline or methods used for data collection and analysis, researchers aim to produce verifiable, reliable, replicable results (Curry, 2009).

Appropriate study design involves striking a balance between the advantages and disadvantages of various designs. Advantages of the qualitative methods used here include the 'insider' perspective of a participant researcher. Information is acquired directly and immediately, and in greater detail. Disadvantages include potential bias and reactivity (Bonner and Tolhurst, 2002; Cassell and Symon, 2004; Kim, 2008). These can be amplified in participant observation, in which events are interpreted through the eyes of a single observer (Fraenkel et al., 1993). The method involves taking extensive notes and noting impressions. I was aware as I conducted this research that my views might bias my collection, analysis and interpretation of the data. The term 'going native' means immersing oneself in the research, becoming involved with and sympathetic to the group of people being studied to the extent that objectivity may be lost (Dwyer and Buckle, 2009). In the role of observer and participant in the activities and events observed, it is easy to influence other people's behaviour, introducing the problem of reactivity and influencing what is observed. This role (observer and participant) is further discussed in Chapter Three.

1.9.8 Perceptions and attitudes of teachers

Teachers may find that creating a balance between engaging and managing cultural values and diversity is a challenge (NALDIC, 2011). Research studies have found that teachers' skills have implications for improving the performance of EAL learners in the UK, Australia, America and Canada (Thomason, 2003; Samson, 2012; Walker, 2012; Foley et al., 2013). These studies suggest that teachers struggle to find effective strategies to teach EAL learners (Hall, 2002). A study carried out in 2003 by the Teacher Training Agency (TTA) found that only a quarter of newly qualified teachers felt well-equipped to teach EAL learners (DfES, 2003). Only 27 per cent of newly qualified teachers (NQTs) felt that their training adequately prepared them to teach EAL learners (National College for Teaching and Leadership (NCTL), 2015). There seem to be discrepancies in capacity building, practice and procedure for EAL support, even in instances where attempts have been made to address the situation (Skinner, 2009).

In England, all learners can attend state-funded schools irrespective of their English language proficiency. Without capacity building, teachers are expected to identify effective strategies to teach EAL learners (Costa et al., 2005). According to Hawkins (2004), instructional practices alone are insufficient for students trying to learn in another language, as is the notion that teachers will learn on the job and that learners will be able to speak English and access the curriculum simply by being in school. EAL research suggests that TEL can facilitate attainment in EAL learners (Thorne, 2003; Warschauer, 2005). To consider how teachers might address the needs of EAL learners, it is first important to understand EAL learners and their learning identities. This is discussed in Chapter Two.

1.9.9 Research methods and ethical considerations

The study uses a mixed-method approach, incorporating both quantitative and qualitative methods of data collection and analysis. Questionnaires were employed to gather quantitative data and to record the direct responses of research participants. Evaluative tests were performed at the start and end of the main study and the results analysed. Alongside this data collection were focus-group discussions and classroom observations, to provide an in-depth insight into the potential benefits of using TEL with EAL learners in the classroom. The sample consisted of 59 participants: 50 selected EAL learners, six subject teachers and three department heads (English, mathematics and MFL). Learners were given 30 minutes to complete questionnaires; 50 minutes were allocated for each focus-group discussion. Half an hour was spent analysing each EAL learner's academic progress record, resulting in a total of 50 x 30 minutes of analysis time, or 25 hours. The details of the methodology used, the data-gathering technique and the sample selection and sampling technique are discussed in Chapter Three.

The study was conducted and the data recorded according to the ethical principles of voluntary informed consent, and the right to withdraw, as well as confidentiality (British Education Research Association (BERA), 2011). Participants were informed about the research aims and their involvement in the research (Farrell, 2005; see study information sheets in Appendix F).

An investigation involving children is potentially more problematic than one involving adults. However, it was harder to gain informed consent from child research respondents than from adults because of their limited ability to foresee possible risks and consequences (Vetenskapsrådet, 2009). This research study has therefore been handled with caution, adhering strictly to the BERA 2011 ethical guidelines and UK Data Protection Act of 1998. During the study, any situation that arose in which a research participant clearly rejected requests for observation (saying no, asking to leave, not be observed or not be engaged in the study, not responding, pulling away, ignoring or resisting participation), the participant's wishes were respected.

Stringent precautions were taken to protect children by ensuring there was no conflict of interest between the researcher and participants. Potential risks of the study, and how these might be addressed, were considered. Ethical issues related mainly to interview methods, whereby participants might realise on later reflection that they had disclosed more than they intended to. Careful measures were taken to ensure a safe environment. Confidentiality was protected, and information was not shared.

Ethical judgments were made in the study because it involved human participants. Provisions were made for the potential disclosure of abuse, including whom to contact and what to do if research participants experienced abuse. Prior to the study, a set of protocols to respond quickly and efficiently to disclosures of ill-treatment was put in place to report abuse, and participants were briefed before the start of the study (Irenyi et al., 2006). A safe environment was also provided whereby the learner could report abuse during the study if it occurred. This was done with the designated child-protection officers in the school (see Appendix E). Research participants were told who the protection officers were and whom to contact if any abuse occurred during the study. This was undertaken so that, if abuse was disclosed, immediate support, comfort and assistance could be provided to protect the child. If the help of external agencies was required, participants could be connected to professional services to keep them safe, offer support and facilitate their recovery from trauma (see letters of consent and study information pack in Appendices E and F).

Where data were obtained from participants, the information was treated with high confidentiality and stored in secure locations. To ensure confidentiality, research data was protected by applying the Data Protection Act (1998), using physical controls and access controls to the data, coding data, statistical methods whereby anonymity was maintained, and adopting confidential reporting methods.

1.10 Anticipated study outcomes

The aim of this study is to explore the impact of the use of consistent and structured TEL on EAL learning in English, mathematics, and MFL in a secondary education state school (DfES, 2003; Dunne, 2007).

In the first instance, it is hoped that structured and consistent use of TEL can present text in a highly structured way and pace the introduction of new concepts and skills according to the progress learners make throughout the programme. It is also hoped that the structured and consistent use of TEL will provide online access to study materials and a source of additional module activity to enhance EAL learning.

It is anticipated that academic staff will be encouraged consistently to use TEL and virtual learning environments, such as a platform to provide online access to the study material and as the source of the additional online module activities mentioned above.

1.11 Contribution to knowledge

This study is relevant to teaching and learning and has direct implications for EAL teaching and attainment, specifically in secondary education. It contributes to knowledge by exploring the impact of the use of TEL on EAL learners' academic achievement in three subject areas, and considering whether TEL practices in the classroom benefit EAL learners.

The research explores whether English language difficulties for EAL learners impact their access to and engagement with the curriculum, and whether the use of structured and consistent use of TEL supports all learners to improve their academic achievement in the three selected subjects.

The study is relevant since it was conducted in the London Borough of Islington, in a borough and school with a high percentage of EAL learners (Faith Valley Ofsted Report, 2012; The Guardian, 2012; Islington Annual Report, 2016).

In researching the impact of structured and consistent use of TEL on EAL attainment, the study considers teachers' perceptions, attitudes, knowledge and skills in the use of TEL, and how these influence the teaching and learning of EAL learners. The study assesses ways in which use of TEL may positively impact EAL learners' attainment and academic progress. Regarding educational impact, it is hoped that the use of structured and consistent use of TEL will improve EAL attainment in a deprived borough setting with a high percentage of EAL learners and will contribute significantly

to findings on EAL learning and academic attainment. As a small-scale study, it can provide a point of reference. Its findings could serve as a pilot study for subsequent large-scale research to deepen knowledge in the area, resulting in effective EAL learning policies and efficient ways of improving attainment of EAL learners. Issues such as teachers' education in the use of TEL, or lack of effective means of support for EAL learners, can be explored further.

1.12 Organisation of the study

Chapter One introduces and establishes a point of reference for the study. Chapter Two reviews and analyses past and current literature in the field and presents key theoretical concepts that shape and inform this study. Chapter Three discusses the methodology. Chapter Four presents, discusses and analyses the data. The analysis in Chapter Five responds to the three main research questions shaping the study. Chapter Six concludes the study and provides recommendations for professional practice and future research.

1.13 Chapter summary

In this introductory chapter, the study's principal objectives and rationale were outlined, together with the background and context in which the study was situated. Ethical implications and the contribution to knowledge were considered. Consideration was given to how learners could be assisted, through structured and consistent use of TEL. Teachers' perceptions of the EAL learner and the learning environments were discussed. The identities and needs of EAL learners were highlighted, laying the foundation for the study. Chapter Two reviews the literature on these issues in detail.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

As mentioned in Chapter One, there are approximately one million EAL children in the UK (NALDIC, 2014; Leung, 2005). They may belong to well-established ethnic minorities or be the children of migrants, refugees and asylum-seekers who have recently relocated to the UK (Arnot et al., 2014). They may live in large towns or more remote rural areas, with some appearing 'invisible' because they are not enrolled in formal education and are, as a result, excluded from school records (Arnot et al., 2014). Some learners may have been well educated in their country of origin, while others may have had little, or disrupted, schooling (Arnot 2014, et al.). Regardless of their origin, learning English and integrating into the school system will probably be challenging for these children (Arnot et al., 2014; Guardian, 2012).

As outlined in Chapter One, several studies have suggested that EAL learners may experience challenges in using the English language for academic purposes and that this may create barriers to successful attainment and achievement in school (Evans et al., 2016). This study explores the impact of the application of TEL strategies in English, mathematics and MFL. In particular, it examines the role that TEL may play in improving the attainment and achievement of EAL learners in a specific, state-funded, secondary school.

Recurring themes and significant concepts within the literature are examined to establish a 'grounded background' (Burgess et al., 2006). This is facilitated by a review of literature in six relevant areas: 1) conceptualisation of TEL; 2) teaching styles; 3) the identity of EAL learners; 4) a pedagogical discussion of learner-centred approaches; 5) second-language acquisition; and 6) the perceptions and attitudes of teachers.

2.2 Undertaking my literature review

This literature review was undertaken by searching for and critically examining current academic literature that focuses on the key areas relevant to the research question and aims of this study. I used Google Scholar and the University of Greenwich's

databases, such as LibrarySearch, to identify relevant international and national academic, peer-reviewed research articles. Searches for terms related to the purpose of this study included technology enhanced learning, EAL learners, and secondary schools.

In planning my review, I used a number of approaches. I systematically looked at everything I thought was relevant in the library. I then adopted a retrospective approach, looking at journal articles related to my study topic. In arriving at useful leads, I used citations to search around my topic. When I had a clear picture about what I needed to find out, I targeted my information search.

I used books, journal articles, statistical information, policy documents and the internet to locate appropriate books and textbooks that summarise key theories in the area of study. I started by searching for books that presented research findings in a clear and comprehensive way. To do this I consulted the library catalogue lists available in the University of Greenwich's libraries; catalogues available in other libraries such as COPAC (www.copac.ac.uk); and a combined catalogue of the biggest libraries in the United Kingdom and Ireland. I also looked at journals where current and up-to-date practice and research material in my selected area of study were discussed.

The use of keywords was instrumental in my literature review. I selected keywords and catch phrases that described the topic as simply and distinctively as possible to make my search easier. Selecting keywords was sometimes straightforward but at other times was a bit tricky and complicated requiring careful thought and multiple attempts. In selecting keywords, I used a range of techniques and approaches such as specific terms; similar and related terms; spellings and terminology. I also searched for phrases using quotation marks, and a combination of terms using AND, OR and NOT. After locating the materials required, I evaluated and recorded my results. I then analysed the material I found to ascertain whether it was the kind of information I needed. The outcomes of the materials I located were recorded for ease of referencing.

Once I had evaluated and recorded my initial results, I reviewed and revised my search plan, in order to fill in gaps in the material I had found. In order to access scholarly material, I limited my searches to academic and peer-reviewed journal search options, available on many databases, making sure that I was using academic rather than trade

journals. I also limited my internet search to sites which ended in .ac or .edu, and I continued reviewing and revising my search plan and recording and evaluating my results.

2.3 Conceptualisation of TEL

2.3.1 Defining TEL

The term TEL (technology enhanced learning) is widely used in many countries, including the UK, to describe the use of ICT (information and communications technologies) in teaching and learning. TEL does not, however, lend itself to a specific definition. That is because it implies a value judgment, since the word 'enhanced' indicates that something is being improved or strengthened. Precisely what will be enhanced when technology is used in teaching and learning, how learning will be enhanced, and in what way enhancement can be determined, are not questions that easily lend themselves to specification and quantification (Kirkwood and Price, 2014).

As a result, TEL has been defined in numerous ways, and no single conceptualisation has been developed (Walker et al., 2012). However, put most simply, TEL describes the online application of information and communications technology to teaching and learning (Hennessy et al., 2010; Higgins, 2012; Steffens, 2008; Walker et al., 2012). Often, it is treated as synonymous with equipment and infrastructure (Kirkwood and Price, 2014).

In recent years, the use of TEL in teaching and learning has become increasingly common, and has altered the way in which instruction and content are delivered (Glenn, 2008; Dillon, 2000). The increasingly pervasive nature of TEL requires teachers and educators to take a close look at its implications within the classroom (Parris et al., 2016).

Since the 1990s, the use of TEL within the educational sector has grown considerably. Researchers have stated that, 'perhaps one of the best-documented successes with computers in education is in developing students' writing' (Peck and Dorricott, 1994: 11-14). Others note that it has 'become explicitly clear that basic motivational and short workshop schemes are hugely inadequate to help teachers to teach differently and to teach well with technologies' (Hawkins and Honey, 1993: 35). Furthermore, using TEL

can be expensive, both in terms of the financial investments made by organisations for resources, equipment and technical support staff, and in terms of the investment of personal time and effort by teachers and learners. In tertiary institutions, 'TEL environments' are almost ubiquitous, and their use by teachers and learners can no longer be taken as a new territory for enthusiasts alone (Naismith et al., 2004; Hwang, 2009; Sharples, 2009). Despite growth in practice, concerns are still expressed regarding the limits to using TEL to boost pupils' learning experience (Cuban, 2001; Guri-Rosenblit, 2009; Kirkwood and Price, 2005; Zemsky and Massy, 2004). The dissemination of 'good practice' and 'lessons learned' among members of the education community may therefore have the potential to assist practitioners to concentrate on the effective adaptation and implementation of TEL to avoid any possible duplication of effort and expense (Chan et al., 2006).

This study focuses on how the application of TEL can be used to improve EAL students' learning outcomes and, more specifically, on teaching where TEL plays a significant supportive role (Goodyear and Retalis, 2010). This may include technologies such as computers, tablets, the internet, digital-voice recordings, mobile technology and other useful technological enhancements, interactive teaching media, and the use of innovative presentation media such as interactive whiteboards. In addition to the hardware used, it may also apply to technologies such as software-based adaptive learning, content-delivery and the use of simulated environments.

2.3.2 Implications for teaching and learning

A review of the literature regarding the use of TEL in education reveals varying positions. Some researches argue that TEL makes some positive impact; some find no impact; while others emerge with inconclusive results (Springer, 2008; Spector, 2008). This research study finds that TEL has the potential to assist teachers in promoting more engaged learning experiences (Gilakjani, 2013). Therefore, it is vital to consider how teachers are trained in the use of TEL and to challenge stereotypical views concerning its application in order to develop its use to full potential within schools. Underpinning this research study is the belief that TEL can help learners to construct their own knowledge (Groff, 2013). According to the perspective of Avery et al. (2000), integrating TEL can create authentic and practical learning experiences that lead learners from simply operating a mouse to using TEL to develop higher-order

thinking and problem-solving skills. If it is designed appropriately, TEL can help to foster analytical thinking skills and real-life problem-solving skills (Alavi, 1994).

TEL can also facilitate differentiated learning in accordance with the learner's pace; for instance, TEL may enhance learning by reducing challenges for learners who find that the physical task of writing inhibits them from communicating their ideas on paper (Reigeluth, 2009). Dorricott and Peck (1994) suggest that the answer is to use TEL to integrate learning and instruction. By incorporating TEL into lessons, a teacher may have the flexibility to tailor learning to suit the diverse needs of learners, to personalise lessons based on learners' interests, and to create hands-on and minds-on learning experiences that are tailored to match the varied learning preferences of learners. Such an approach may have various potential benefits, and learners could gain the flexibility of learning at their own pace, whether they are learning basic skills or refining problem-solving skills. The core curriculum could be supported through exploratory or inquiry-based learning including the real-world application of concepts. According to Yang (1998), it is more likely that such experiences will foster a more constructivist view of education, causing learners to better retain what they have learned. The use of TEL permits teachers to create situations in which learners can discover meaningful relationships, construct their own knowledge, explore new ways to communicate their learning, increase access to global resources and experience more real-life work-situations, thereby preparing them for their futures (Ertmer et al., 2012).

TEL can assist, support, and equip learners with critical thinking and analytical skills, which are the very skills they will need as they enter higher education and the workplace (Bryan et al, 1999). Research has also indicated that TEL-based, interdisciplinary experiences can mirror real life, thus creating learners who are more highly engaged and focused (Bryan et al., 1999). Additionally, research studies have revealed that TEL can allow more time for teachers to interact with or assess learners, and improve learning within the classroom (O' Donoghue, 2010). TEL tools can be used to create lesson plans, track student progress, generate reports, and retrieve instructional materials from a database of instructional resources. Becker (1994) reported that, the more teachers use TEL, the more confident they feel in using it, and also revealed that new teachers, who were willing to try new ideas, were more technologically inclined. In addition, teachers were more likely to use TEL if colleagues

were doing so, and consequently, learning had a positive impact if class sizes were smaller and TEL support was available (Becker, 1994).

Means and Olson (1994), also assert that TEL has definite advantages, as through the use of TEL teachers can extend and improve the curriculum. They claim that TEL can create a different format for learning (and teaching); one which challenges learners, is multidisciplinary, and includes authentic assessments (Means and Olson, 1994). Using TEL in such a way creates a perfect fit for it to be incorporated into any curriculum that is driven by the learning process. For example, TEL can allow learners to take pride in collaboratively creating work that can be shared with others. Wang et al. (2006) are in agreement with others, and advocate that teachers should be allowed time to create meaningful lessons integrating TEL. Dorricott and Peck (1994) propose that it is what learners do through technology that will determine the role of teachers and the purpose of TEL; therefore, the teacher's role becomes multi-faceted, a facilitator, playwright and 'director', working behind the scenes. This can contribute to enhancing what teachers can do and expect from learners (Waters and Leong, 2011).

Existing research on TEL has proposed recommendations for the use of TEL by teachers in teaching/learning environments and curriculum delivery, and there is a need for a shift in the way teachers think about and use TEL (Levin and Wadmany, 2008). There seems to be such a shift today in thinking about TEL's place within education, and it is advocated that TEL should not be another thing to learn; rather it is another way to teach (Sutherland et al., 2004).

Despite these potential benefits, Yang (1998) discovered that the application of TEL does not equate automatically with better teaching; TEL needs to be skilfully incorporated into the curriculum through deliberate and careful design. To enable teachers to successfully integrate TEL into what is taught, the skills and expertise of teachers needs to be developed, as the majority of teachers simply avoid TEL for fear of the unknown and fear of change (Buabeng-Andoh, 2012).

It is evident from the research examined that there remains a need for teachers to build their capacity to utilise the TEL resources available to them (Cox, 2000; Muntax, 2000; Bingimlas, 2009). Interwoven with this insight is the recognition that challenges presented by the workload of teachers constrain their ability to allocate time to build

their capacity for engaging with and integrating TEL into their practice (Asan, 2002; Salehi, 2012; Hasan and Clement, 2013). This highlights that there is a need to reflect on and develop context-specific on-site support and paid staff development.

Issues of pedagogical approaches, equality and equity can also present challenges for the effective engagement of TEL. Lauman (2000) noted that TEL can assist teachers to meet the needs of learners. However, inconsistencies in effective strategies that take account of the different ability levels of learners, and unequal access to the required TEL to develop and strengthen TEL practice outside the school context contribute to a lack of equity in practice (OECD, 2005; Cox, 2000).

Research evidence over the last 40 years on the impact of digital technologies on learning has consistently identified positive benefits (Hennessey, 2010). However, the growing number of digital technologies available and the diversity of contexts and settings in which the research has been conducted, together with the issues in synthesising evidence from different methodologies, make it hard to ascertain clear and specific implications for educational practice in schools (Hennessey et al., 2010). Research results from studies with experimental and quasi-experimental designs that have been combined in meta-analyses show that the systematic, consistent use of TEL for instructional purposes tends to produce small levels of improvement in comparison with other approaches, such as peer tutoring or the provision of more effective feedback to learners who may be excluded from TEL practice. The range of impacts identified in these studies suggests that it is not simply the use of TEL which makes the difference, but how well TEL is used to facilitate and support teaching and learning, intertwined successfully with what is to be studied (Hennessey, 2010; Wegerif, 2015; Baylor and Ritchie, 2002; Shaunessy, 2005; Teo and Wei, 2001; Hew and Brush, 2007). Thus, what is important is the pedagogy informing the application of TEL in the classroom, the how and not just the what, and this represents a significant factor emerging from and informing this research study.

Studies associating the use of TEL with attainment tend to find some logical and positive links with educational outcomes. However, a causal relationship cannot be inferred from this type of research as the approaches and efficiency informing the application of TEL may not be uniform (Marshall, 2002; Granberg, 2000).

Nevertheless, research findings from the synthesis of meta-analyses reveal interesting and useful ways in which the application of TEL may be beneficial to learners (Selwyn, 2007; Livingstone, 2012; Kozma, 2008). The use of TEL in micro groups is usually more effective than individual use, even though some learners may need help and support in how to collaborate effectively and responsibly (Higgins, 2003). It is also indicated that the adoption of TEL can be powerful and equally effective as a short but focused strategy to improve learning, and this is particularly true when there is regular and frequent use (Noor-UI-Amin, 2013; Higgins, 2012). Some research findings further reveal that giving a tutorial on the use of TEL can be practical for less able and low-attaining pupils, learners with special educational needs, and those from disadvantaged backgrounds, as it can be used to provide intensive support to enable them to catch up with their peers (Dunne et al., 2002). Nevertheless, there needs to be caution concerning the way in which TEL is adopted or embedded (Dunn et al., 2007; Waite et al., 2007). There is compelling evidence that gains in attainment following the use of TEL tend to be greater in some subject disciplines than in others: for example, mathematics and the sciences compared with literacy (Condie and Munro, 2007). In subject-specific areas, there also tend to be variations, since the impact of TEL tends to be higher in writing interventions compared with reading or spelling (Fitzgerald and Shanahan, 2000). The overarching implication is that the use of TEL is a catalyst for change; therefore, it is vital to understand how TEL may bring about positive improvements and make teaching and learning practices more efficient and effective (Higgins, 2003; Jung, 2005).

2.4 Teacher attitudes and TEL implementation

A range of works have used case studies or longitudinal studies of TEL in classrooms within a specific setting to consider why teachers choose to engage with TEL (Levin and Wadmany, 2008; Hennessy et al., 2010). A few reports embrace a quantitative approach, exploring access and the reasons why teachers in schools choose to apply TEL in their classroom practice (Bingimlas, 2009; Hennessy et al., 2010).

Tella (2007) examined Nigerian secondary-school teachers' use of TEL and the implications for the further development of TEL use in schools through a survey of 700 teachers. The findings showed that most teachers perceived TEL as being very useful

and as facilitating teaching and learning. It was advocated that professional development policies should support TEL related teaching models, specifically, those that encourage both learners and teachers to play an active role in teaching activities. In addition, it was advocated that emphasis should be placed on the pedagogy underlying the use of TEL for teaching and learning.

Research and active development projects, such as those carried out by EdQual (a research consortium of educational institutions on educational quality in the UK, Ghana, Rwanda, South Africa and Tanzania) indicate two key reasons why teachers engage with TEL. First, teachers see TEL as kindling students' interest and learning in a subject, promoting a positive attitude towards TEL as an essential part of a lifelong interest in learning. Second, teachers perceive the use of TEL as enhancing the recall of previous learning, providing new stimuli, activating learners' responses, and providing systematic and steady feedback (Bordbar, 2010). TEL is also perceived as sequencing learning appropriately and providing access to a rich source of information (Hennessy et al., 2010; Iheonunekwu et al., 2010). The implication is that teachers will be inclined to apply TEL if they perceive it to be useful (Hennessy et al., 2010).

Nonetheless, TEL needs to be linked to the specific needs of learners, resisting the 'one size fits all' approach (Leach, 2005: 112). The real challenge for educationists is how to harness the potential of TEL to complement the role of a teacher within the teaching and learning process, and there is apprehension, even fear, concerning the role of a teacher in a TEL equipped classroom (Hennessy et al., 2010). Teachers who lack the chance to develop professionally in the use of TEL feel under threat, and the relevance of a teacher in the 21st century is often determined by their willingness to develop in this way (Hennessy et al., 2010; Collins, 2005; Balanskat et al., 2006). The factors contributing to the positive use of TEL by teachers include making lessons engaging, stimulating, diverse and more enjoyable for teachers and their learners in ways that support productive learning. Overall, research findings suggest that the psychological factors of a teacher's own beliefs and attitudes towards TEL and pedagogical innovation are both primary facilitators and barriers to a teacher's use of TEL in the classroom (Hennessy et al., 2010; Somekh, 2008; Prestridge, 2012).

Though TEL may demonstrate the potential to transform learning in the classroom which could be significant for EAL learners, there are still some pertinent debates

regarding its implementation (Naismith et al., 2004; Kabilan, 2010). TEL is at the forefront of debates owing to the implications of access to knowledge and learning online, and how it might exert a significant effect on the social, emotional and physical development of young people (Castells, 2015). For the EAL learner, TEL may offer numerous opportunities for language development (Warschauer, 2011). Furthermore, the degree of TEL policy integration in schools is mixed: some schools have created educational opportunities as a direct result of TEL (Creese, 2010), while others offer selected technological applications for learners (Warschauer, 2005). Many studies report that TEL is positively impacting the attainment of EAL learners, and that the creative incorporation of TEL across the curriculum is improving the attainment levels of EAL learners (Cox et al., 2003; Becta, 2001). However, many researchers believe that these successes are isolated (Eng, 2005) and Reeves (2004) argues that TEL remains inconsistently applied. For instance, learners may spend a considerable amount of time locating information and comparatively little time analysing and processing the information: 'to do' gets more attention than 'to understand' (Reeves, 2004; Jedeskog and Nissen, 2002; Moore, 2005). This produces the 'black-box' syndrome, in which learners produce the output required by a teacher, but have little idea how it was produced and, consequently, are unable to apply the skill to other, similar, situations (Moore, 2005; Peters, 2007).

Higgins (2003) has suggested that the question of whether TEL improves learning and teaching in schools is relatively complex, stating that the demands placed on TEL teachers are very different from those of conventional teaching, and that TEL use is more useful in individual than in group tasks. Higgins et al. (2005) have identified best practice in literacy and numeracy at Key Stage 2 (KS2) in particular, finding that these subjects are perhaps more suited to the use of TEL due to the individual nature of many of the tasks involved. Hennessy et al. (2005) have broadened this to the sciences at the secondary school level, noting the need at all times for teachers to enhance and extend existing classroom practice, but also to accept the possibility of changes in the forms and methods of teaching and learning activity to better suit new technologies. The emphasis on the need for tight teacher supervision, focusing on the need for teachers to overcome the 'potentially obstructive' nature of some TEL by keeping learners focused on their learning objectives, is also notable (Mercer et al., 2003). Consideration of the above-mentioned also has implications for the efficacy of TEL

application in English, mathematics and MFL.

According to Platt et al. (2003), TEL use engenders literacy, as it helps learners to construct longer texts and improve their computer competence, while also improving the quality of their writing. TEL seems to inspire kinaesthetic learners and to support all learners in constructing structured, fluent writing (Platt et al., 2003). The interactive project approach, through TEL, can promote engagement, resulting in learners writing at greater length and with more complex styles, while the application of adapted writing frames improves the learning of language (Platt et al., 2003). The benefits of TEL for MFL represent one area in which a broad range of learning activities and games have emerged, and in which a range of technologies, from mobile phones to video-conferencing, can be incorporated into the curriculum (Travers and Higgs, 2004; HMIE, 2005). This may be particularly useful in English and MFL because of the unique writing styles employed when using the language (Munro, 2007; Levy 2009; Travers and Higgs, 2004). As this can be an area of particular concern for EAL learners, it is important that teachers use the TEL strategies that offer the most support in these areas (Sutherland et al., 2004; Hourigan and Murray, 2010; John, 2005).

In mathematics, the key benefits identified from research into TEL are increased learner motivation, intense focus on approaches and understanding, quicker and more precise feedback to learners, and greater learner collaboration and co-operation (O'Donoghue, 2006; TTA 2002). According to O'Donoghue (2006), TEL-use has contributed significantly to the development of analytical skills, practising numerical skills, and exploring patterns and associations, as well as making all of learners' developing conceptions visible to the whole class (NERF, 2005). Cox et al., (2003) reported that animations and simulations improved comprehension in mathematics and science, and that TEL could also incorporate and generate an array of diagrams and other graphic illustrations of models and processes impossible with conventional resources. For instance, powerful modelling software helped learners to explore 'what if?' scenarios (O'Donoghue, 2006), where students are instantly confronted with the consequences of their decisions and can thus discern which decisions were successful. Instant feedback encourages learners to imagine and continue exploring. The dynamic, symbolic nature of computer environments can help learners to establish links between their innate notions of mathematics and other prescribed parts of

mathematical knowledge (Interactive Education, 2006). This information may provide teachers with insights into the usefulness of TEL in the mathematics classroom and suggest innovative classroom strategies.

On the whole, different opinions on how teachers should use TEL within the classroom largely depend on seven factors: planning, leadership, curriculum alignment, professional development, TEL use, teachers' willingness to change, and teachers' non-school computer use (Baylor and Ritchie, 2002). Teachers' attitudes are based largely upon their personal willingness to use TEL in the classroom, although, once schools acquire equipment to facilitate this, questions will undoubtedly arise regarding how to use it, and in many instances, such questions may be directed to the teachers (Baylor and Ritchie, 2002).

Teachers generally take one of two approaches to TEL implementation in the classroom, related to Bloom's 1956's taxonomy: TEL for developing comprehension and TEL for developing higher-order thinking (Watson, 2000; Akesela, 2005; Kong, 2014; Eteokleous, 2008). This distinction is difficult to measure because, although TEL is applied in the classroom in both cases, one approach (TEL for developing higher-order thinking) is significantly more detail-oriented and learner-centred (Claro et al., 2012; Balanskat et al., 2006; Sang et al., 2010). In addition to teachers' use of TEL in the classroom, perceptions of TEL can vary according to the amount of non-school computer use (Evans-Andris, 1995). Teachers can embody three patterns for TEL implementation: avoidance, integration, and technical specialisation. Each pattern is associated with classroom use, with teachers who conform to the technical specialisation pattern using TEL significantly more frequently than those with an avoidance pattern (Evans-Andris, 1995; Sharpe, 2013). Although Evans-Andris (1995) might be somewhat outdated regarding TEL classroom practice, her findings apply to the current situation, since some teachers are still likely to fall into the avoidance category (Sharpe, 2013; Schmidt et al., 2009).

The use of TEL, therefore, depends on the teaching style and strategy adopted by teachers and educators to be successful and make a visible impact.

2.4.1 Teaching styles

It has been suggested that the use of TEL alters education methods by offering

practices which provide learners with practical and authentic learning experiences and encourages schools to develop innovative TEL applications for problem-based, collaborative learning (Reeves, 2004). This places teachers in a unique position, as they move from a teacher-centred role to an 'enabler' (Vollmer, 2000; Schmidt, 2000). However, the use of TEL may be particularly challenging for many teachers, asking them to forsake conventional teaching for unfamiliar practices: facilitating 'computer-supported collaborative learning' or 'computer-supported problem-based learning' (Harklau, 1999). While teachers may struggle to become facilitators, learners must also adapt to a situation of independent learning. For many EAL learners, the teacher-centred approach is comfortable and offers the expected (Kramsch, 2000), while TEL and authentic materials present learners with the unknown (Weber et al., 2008).

Furthermore, the assertion that TEL use can shape the development of deep learning and high-level critical thinking and analysis has some validity, but there are also limitations (Chen et al., 2010; Kop and Hill, 2008). TEL on its own does not always lead to these developments, as it is the combination of TEL with processes of reflection and dialogue that can enable learners to experience deep learning and strengthen critical thinking skills (Wegerif, 2015). The limitations of TEL as a facilitating tool point to the need for a dialogic theoretical conceptualisation. A dialogic, theoretical approach combines an understanding of the role of TEL with an understanding of the importance of maintaining different voices in tension (Lund, 2003; Dyke, 2007).

Traditional teaching styles have evolved following the advent of differentiated instruction, prompting teachers to adjust their styles toward learners' needs (Landrum and McDuffie, 2010; Tomlinson, 2014). The main teaching styles influencing the roles adopted by teachers are those of the authority, the demonstrator, the facilitator, the delegator, and learner-centred approaches that may engage hybrid or blended eclectic styles (Dunn et al., 2002; Subban, 2006).

A hybrid approach integrates different elements of various teaching styles and provides teachers with the ability and flexibility to adopt a personal style that is appropriate for the learners they teach (Barron and Darling-Hammond, 2008). Learner-centred approaches, such as a facilitator style to teaching, have emerged as alternatives to traditional, teacher-centred approaches such as the authority or demonstrator style, with this shift partly due to frustration with traditional approaches,

which tend to be based on the idea of transmitting an established body of information to a learner (Mascolo, 2009). This shift also involves investigating ways of adapting teaching to learners' needs and engaging learners more in activities. Learner-centred approaches may provide learners with independence and control over the selection of content, learning methods and learning pace (Weimer, 2002; Donnelly and Fitzmaurice, 2005). Furthermore, contemporary teaching styles tend to be group-focused and inquiry-driven (Barron and Darling-Hammond, 2008; Kirschner et al., 2006). As a teaching approach, for example, constructivist teaching styles embrace subsets of alternative, group-focused and inquiry-driven teaching styles, including modelling, coaching, and test preparation through rubrics scaffolding (Shirinova and Musayeva, 2017). All of these are crafted to promote and sustain learner involvement and necessitate a hybrid approach to teaching. A possible downside of the constructivist approach is that it may cater to group-oriented learners more than to learners with preferences for individual-based learning styles; for example, this could be a preference that may prevail among autistic learners (Thomas, 2010; Paramythis, 2008; Lam et al., 2007).

Teaching EAL learners is an active, on-going process, through which learners can develop an in-depth understanding and take control of their learning for the best possible educational experience in a flexible and stimulating environment (Muller, 1998). This may also enable EAL learners to access resources to develop their learning skills and self-awareness about how they learn, making them more independent in their learning and better able to reach their potential (Lea et al., 2003).

The learner-centred approach focuses on the process of learning and optimising learning opportunities (Blumberg, 2004; Doyle, 2008). For EAL learners, this could mean developing abilities through experiences of autonomy (Ratey, 2002; Goldberg, 2009), for example, by providing them with a learning context in which they select the quantity and type of learning resources, tailored to their learning needs and motivations. A learner-centred approach has implications for EAL curriculum design and implementation in schools, although contextualised resources relating to the lived experiences of learners, problem-based learning (PBL), and differentiated resources, instruction styles and formal formative assessment, can address these challenges (Alexandria, 2002; Boud and Feletti, 1997, Donnelly and Fitzmaurice, 2005, Edwards,

2001). However, the implications for teaching EAL in schools still need to be explored (Donnelly and Fitzmaurice, 2005).

Moreover, recent projects, especially the Argunaut and Metafora projects (Wegerif, 2015) illustrate how the complex competences of learning to learn, together with TEL, could be taught in schools. The Argunaut and Metafora projects demonstrate ways in which technological supports could be used to expand and sustain the dialogic space, to teach collective critical thinking in the context of understanding knowledge-domain areas and solving actual problems. Although learners tended to collaborate in classrooms, their collaboration was mediated by online tools (Wegerif, 2015). There is, therefore, no reason why a similar approach to learning and teaching could not be adopted and integrated into TEL approaches for EAL learners in secondary schools. In the emerging internet age, the greatest challenge is teaching better collective critical thinking, and a dialogic approach could facilitate this, underpinned by the assumption that thinking is a dialogical process and that teaching critical thinking using TEL and pedagogy may enrich the space for, and process of, dialogue (Prestridge, 2012).

The hybrid approach, the learner-centred approach, and constructive teaching methods may provide teachers with the flexibility to adopt personal styles that are appropriate for the EAL learners they teach while employing TEL in subject content delivery. This may allow teachers in the study to embrace aspects of alternative teaching styles, such as modelling and coaching, and to apply the appropriate scaffolding for EAL learners as and when needed. The use of these teaching approaches may help encourage and sustain learner involvement (Blumberg, 2009; Doyle, 2008).

2.4.2 EAL learner identity and implications for learning

This section discusses issues related to the identity of EAL learners, including socio-cultural diversity and stages of English language acquisition in relation to teaching/learning processes.

EAL learners can be categorised according to their stage of English language acquisition, as this strongly impacts on learning and teaching strategies (Bialystok and Miller, 2001; Cameron et al., 1996). The terminology 'EAL' is common in formal education in the UK, where it is used to describe learners who speak one or more

languages other than English, and who are studying English mainly in an educational setting. It is currently also used in the research literature, and best represents the sample population in this study. This term has been adopted in the UK, while the expression 'English as a Second Language' (ESL) is used more widely elsewhere (Alexandria, 1999).

In postmodern terms, identity is a complex and multifaceted concept (Cummins, 2000; Harklau, 1999). Identity, whether self-defined or otherwise, has created a variety of challenges for language teaching, mainly in the EAL classroom, where formerly taken-for-granted concepts such as 'native' or 'non-native speaker', and 'first and second language', are being challenged (Morita, 2004).

Conceptually, identity includes how one sees oneself and how others perceive one, how one places oneself in one's environment and culture, and the new settings in which one finds oneself: the target culture (Alexandria, 1999). EAL learners enter the learning context from a wide variety of backgrounds and have distinctive needs; an understanding of the social and cultural backgrounds of learners is thus crucial to identifying their language needs and how these may have an impact on their learning (Gonzalez, 2007). According to NALDIC (1999), EAL learners are unique in many ways, and although they may share many traits with learners whose first language is English and have the same learning needs as others in British schools, they have particular needs because they are learning in a different language, with different backgrounds, understandings, and expectations of education, language and learning. Taken together, these influence their academic and cognitive development, as well as their language development needs (Jewitt, 2008).

EAL learners can develop English for survival within one year, and English for conversation in two to three years, but it takes five to seven years for bilingual learners to gain competency in a second language on a par with their peers who are proficient in English as a first language (Harklau, 1999; Cummins, 2000). EAL learners require ongoing assistance with language skills during Key Stage 3 (KS3) and Key Stage 4 (KS4), as KS4 EAL learners may underachieve in English writing (Cameron, 2003). In the UK, there is substantial evidence that EAL development, even for learners who have lived in the UK for a decade, is different from that of first language English speakers (Barnett, 2002). Fluency in spoken English is normally gained within two

years; however, being able to read and comprehend difficult text, and to write the academic English required for success in examinations, takes significantly longer (Ofsted, 2001).

Furthermore, according to Vygotsky (1978) there is a zone of proximal development which, for an EAL learner, can be considered to be the distance between their actual development level and their potential development. This zone of proximal development importantly incorporates all the knowledge and skills an individual cannot yet understand or do on their own but will be capable of developing with assistance (Vygotsky, 1978). As an EAL learner develops new skills and abilities, this zone moves steadily. For instance, a teacher in a science class might initially provide scaffolding for EAL learners through TEL by assisting them gradually through their experiments, but later withdraw the scaffolding by providing only an outline of how to continue until, finally, learners will be expected to develop and undertake experiments alone.

Peer interaction can also be regarded as an essential component of the learning process (Vygotsky, 1978) and, in order for EAL learners to learn new skills, they could be paired with more proficient English language learners. When a learner is in this zone of proximal development, providing them with the right support and tools, referred to as scaffolding, provides learners with what they need to complete a new task or acquire a new skill (Vygotsky, 1978; Mercer et al., 1999). The scaffolding can be removed when a learner completes the task independently. There may be special issues with EAL learners, as the language skills that they have may be insufficient to produce required shared reactions and environments (Roth and Tobin, 2007; Rogoff, 2008).

One important way of evaluating the diverse challenges for EAL learners is to assess current techniques, based on how well they can be said to fit within the socio-cultural world of a learner and their relevant needs. Mercer (1973) identified the role of socio-cultural issues with assessments such as testing. Given the importance of this factor in even relatively simple issues – such as question phrasing in tests, cultural assumptions, and the complications of interactions with the language – these need also to be considered in TEL processes. Outside of the world of EAL, Mercer (2004) and Twiner (2011) have analysed productive interaction through a socio-cultural perspective, evaluating the human-technology link to show that adult users approach

software in a variety of ways and that their success levels may depend, at least partially, on their socio-cultural background. This is arguably particularly important in the case of EAL learners, as they both face a greater challenge through the need to master English as they learn and also come up against software that is statistically unlikely to have been created with their minority needs in mind. Indeed, Mercer (1995) suggests that language may work as a social mode of development and, if this is extended, it suggests that EAL learners at an early stage of language acquisition may have further barriers to learning due to an inability fully to access learning through TEL.

Mercer et al. (1999) extend this reasoning by showing that the use of shared language can function as an aid to the development of reasoning, and Roth and Tobin (2007) also emphasise the different styles of learning created by the socio-cultural background of a learner.

Localised software for TEL is thus potentially a double-edged sword. It is possible for social exclusion to occur and for TEL software to provide materials and interactions in the home language of an EAL learner, but their special needs, such as seeing the success of others like them modelled, or the use of learning methods that may have been used at home or in other school systems, may not be properly dealt with if the developer of the TEL has not considered these issues.

Rogoff (2008) also deals with the impact of learning communities on learners and the importance of the socio-cultural position of EAL learners within a group during the process of participatory appropriation, and guided participation in particular. Given that Rogoff (2008) has a clear stance, similar to that of Mercer (1995), that shared communication is a profound aid to learning, it is clear that TEL can be usefully evaluated via this perspective when directly applied to TEL tools and methodologies, and also when it is applied to the way that these technologies do or do not adapt to the learning style and integration of EAL students within the broader group.

In the same way, cultural tools are shared skills and approaches. These allow for the spaces that are shared to produce meaningful interactions, given that even learning is partially undertaken by culturally pre-planned activities (Jenkins et al., 2009; Montori, 2006; Bruner, 1983; Dewey, 1916; Goody, 1989; John-Steiner, 1985; Lave and Wenger, 1991; Kagitcibasi, 2007; Rogoff, 2003; Valsiner, 2000; Wertsch, 1985).

However, these may or may not properly fit minority members of a group, and the risk of excluding EAL learners with differing cultural tools and ways of learning is real. Learners live in a community by virtue of the things that they have in common and can advance more quickly when they can apply the cultural tools that they already possess (Dewey, 1916).

This perspective steps away from the teacher-driven classroom to the world, which is more like Sfard's (1998) split between the acquisition metaphor and the participation metaphor. In the acquisition metaphor, a teacher merely delivers set materials (possibly adapted for language) and waits for learners to absorb them. In contrast, the participation metaphor is considerably more demanding, with the emphasis on participation putting more weight on classroom interaction. If the stance that learning, cognition and knowing must be distributed is accepted, then it is perhaps unsurprising that EAL learners have diverse needs when interacting, building relations and forming networks of individuals within the learning environment. This must necessarily interact with socio-cultural theory, in the same way that social interaction, dialogue and sharing are central to learning (Lave and Wenger, 1991; Vygotsky, 1978) and the interactions possible under Sfard's (1998) model of both learning and development of identity. Given the above, the successful integration of a student within the classroom through both TEL and teaching/learning methods is central to their success and to the learning trajectory achieved.

Socio-cultural approaches share the conviction that learners' learning and development occur in historically-situated activities that are arbitrated by their culture through inter-subjective experiences in which they participate with other members of the community (Wood, 2010; Englert, 2006). These approaches emphasise that culture can present EAL learners with tasks that are considered essential for their education and suitable for their participation (Lantolf, 2000; Basharina, 2007) Depending on the priorities of their culture, learners' participation occurs in formal and informal school, home, and community activities with their teachers, peers, family and community members (Cole, 1996; John-Steiner, 1985; Kagitcibasi, 2007; Rogoff, 2003; Valsiner, 2000; Wertsch, 1985). Such opportunities can be tailored to suit the developmental and individual capabilities of learners in tacit or explicit ways (Rogoff, 2003; Valsiner, 2000).

EAL learners' engagement can be arbitrated through artefacts, for instance, language and TEL, and guidance that can range from playing to observational opportunities and clear instructions (Roth and Lee, 2007). By participating in cultural activities mediated in this manner, EAL learners can negotiate the meanings of their culture, accepting, rejecting, or transforming them (Lantolf, 2000; Morita, 2004). Thus, socio-cultural views do not perceive development as predetermined (Göncü and Gauvain, 2010). Instead, the social world provides the growing mind with a dynamic and mutually created context that originates in, and is sustained by, the contributions and goals of the participants (Wenger, 2010).

A socio-cultural perspective recognises individual variation, that is, the unique characteristics of a person (Ushioda, 2009). These range from multiple cultural affiliations to tendencies and constraints of the biological system, such as temperament and certain learning disabilities, and coordinate with social and cultural backgrounds in ways that produce a unique process of cognitive development matched to the conditions in which an EAL learner lives (Mesoudi, 2016).

2.4.3 A socio-cultural perspective on second-language acquisition

Unlike their monolingual peers whose first language is English, EAL learners can go through different stages of learning and knowledge acquisition. These stages have been categorised by Cummins (2000) and Grenfell (2006) as two different language proficiencies: basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP). BICS and 'surface skill' acquisition, such as the skills of listening and speaking, are normally quickly acquired by EAL learners, whereas the CALP development stage is the basis for EAL learners to manage the academic demands that are placed on them (Cummins, 2000).

Research indicates that EAL learners learn concepts and skills through experience (Caputi et al., 2006; Leung, 2006; Coyle et al., 2010). This occurs as they work and learn in rich contexts that mirror problems and practices in a given discipline (Bruner, 2004; Lave and Wenger, 1991; Rogoff, 2008; Hammond and Gibbons, 2005). EAL learners' learning is more insightful when they involve themselves in realistic practise (Roth, 1994; Sawyer, 2006) that includes the social and epistemic practices of a discipline and puts key concepts into productive use (Duschl, 2008; Duschl and

Grandy, 2008; Engle and Conant, 2002; Rosebery et al., 1992).

Socio-cultural theory has positively impacted upon learning, especially in the field of second language acquisition (SLA) for EAL learners (Kormos et al., 2011; Moyer, 2004). This theory sees learning, including SLA, as a semiotic procedure, in which engaging in socially mediated activities is essential (Turuk, 2008; Lantolf, 2015). It considers teaching to be vital to second-language development and suggests that it is geared to the zone of proximal development that transcends the actual development level of the learner (Gibbons, 2006; Benson, 2013). SLA suggests that learning in a second language context should be a combined accomplishment, and not the effort of an isolated individual (Donato, 2000; Dornyei, 2014).

2.5 Socio-cultural theory and implications for second language teaching

Socio-cultural theory postulates that self-consciousness arises, not from an individual, but from their social relations with other people, and that the individual dimension of consciousness is derivative and secondary (Vygotsky, 1978; Turuk, 2008).

Socio-cultural theory emphasises social participation, collaboration, relationships, engagement with others, the settings of activities, and historical change (Scribner, 1997). It highlights the fact that human cognition is mediated by cultural artefacts, such as tools and signs. Human cognition, according to socio-cultural theory, occurs in human purposive activity ('human action-in-the-world') and develops gradually as changes at the socio-cultural level influence mental function, which is to say that social interaction has primacy in human development (Scribner, 1997). According to socio-cultural theorists, social involvement can encourage different exchanges between social practice and 'the self', and participation in a range of activities becomes a crucial social source of development. Cultural artefacts play a vital role in linking human reasoning and cultural and historical circumstances, as carriers of socio-cultural patterns and knowledge (Wertsch, 1994; Nasir and Hand, 2006, Allahyar and Nazari, 2012). As social situations change, environments and opportunities for the growth of human cognition alter. Learning, from the socio-cultural standpoint, is situated (Lave and Wenger, 1998) occurs uninterruptedly through interactions between an individual and the social context through cultural mediations, and changes within socio-cultural history (Lave and Wenger, 1998; Rogoff, 2008).

The socio-cultural perspective of learning concentrates on the interdependence of the social and personal process in the creation of knowledge (Rogoff, 2008). Knowledge encompasses one's intellectual ability and self-knowledge. In this sense, understanding oneself – the process of constructing identity – is a form of learning, as a socio-cultural process. Since identity emanates from daily activities and experience of engagement in social practices, studying lived experiences and activities within everyday life plays a major role in comprehending the idea of identity and scrutinising the process of identity construction (Wenger, 1998). In specific terms, the idea of activity can be used as the unit of analysis to explain how people create their identity in daily life (Rogoff, 2008).

In the socio-cultural concept, people study within human actions-in-the-world, through dynamic and continual engagement in activities and events; in this way people operate, learn, develop and evolve (Sawchuk, 2013). As socially-formed individuals, humans shape their personalities, skills and consciousness by engaging in activities. Thus, activity, as the minimal meaningful context, can explain how people live out their lives, and how they learn their identity in daily life (Sannino et al., 2009; Sawchuk, 2013).

Language-acquisition is a natural process, the mechanics of which acquirers are not normally aware of; neither are they typically conscious that they are acquiring new knowledge (Cummins, 2010). For socio-cultural theorists such as Vygotsky (1978), language is created via social and cultural actions, and is only later reconstructed as a personal, psychological event. Based on this, SLA theory centres on learner-involvement in social activities, such as interacting with classmates and teachers or having out-of-class conversations (Lantolf, 2000; Hung and Chen, 2001).

Socio-cultural ideas about language, and about learning to use language in real-world situations, are crucial to learning, where the focus is on language, not as an input, but as a resource for participation in everyday activities. Involvement in these activities is both the product and the process of learning (Lantolf, 2000; Zuengler, 2006). For socio-culturalists, languages are not hardwired in the brain; rather, the shift from first to second language involves cognitive processes of re-conceptualisation through social interaction (Hattum, 2006). SLA researchers have focused on the linguistic growth of learners in the zone of proximal development, whereby an individual achieves more, for example, working collaboratively rather than individually (Vygotsky, 1978; Walqui,

2000).

The importance of building meaning in the act of learning is crucial to second-language classroom interactions, and Lantolf (2000) argues that enhancing learner competency in second-language classrooms should not focus on the mastering of skills. Too great a focus on skills may prevent learners from engaging with literacy aspects, such as meaning-creation, competency, fluency and flexibility in dealing with texts as readers and writers.

The social aspect of teaching a second language has also become a significant part of second-language classroom literature (Lantolf, 2000). According to the genre approach, language should be made accessible and should be a tool for teachers. Here, the emphasis is on social uses of language according to context, which is consistent with Vygotsky's (1978) ideas about language as a social element for communication.

A clear application of socio-cultural theory principles in the second-language classroom is evident in the task-based approach, which stresses the social and collaborative essence of learning. Leung (2002) argues that socio-cultural theory dwells on how a learner completes a task and how collaboration among learners can assist the second language acquisition process. Leung (2002) postulates that collaboration and interaction among peers creates a collective zone of proximal development, from which all learners can benefit.

The task-based approach focuses on how learners scaffold each other through interactions, a concept essential to Vygotsky's theory of learning. The concept of internalisation is integral to Vygotsky's theory, as well as in second language classrooms. Vygotsky encourages teachers not to concentrate too much on teaching concrete facts, but also to push their learners into an abstract world in order to assist them to acquire multiple skills that will help them to deal with complex learning tasks. Nieto (2002) claims that encouraging the regurgitation of facts and the repetition of accepted ideas produces uninspired learners, implying that EAL learners should be taught how to create, adjust their strategies, and assimilate learning activities into their personal world.

Second-language learners require explicit instruction to acquire fundamental second-

language skills, and a lack of such skills can hinder their progress and improvement as competent readers, writers and language users. In the second-language context, there is still a need for learning tasks and stages to be graded to facilitate easy understanding, and there is still a need for knowledgeable teachers to assist second-language learners in developing layers of knowledge and understanding before they are left on their own. These are tasks that learners cannot handle independently, particularly during the early stages of learning (Turuk, 2008; Myles, 2002).

Task-based language learning (TBLL) borders on the use of authentic language, and on asking learners to undertake meaningful tasks using the target language, for example visiting a doctor or conducting an interview. Assessment is primarily based on the appropriate completion of tasks, rather than on language accuracy. TBLL is popular for developing target language fluency and learner confidence (Willis and Willis, 2013).

According to Reeves (2002), TBLL consists of the pre-task, the task cycle, and the language focus. Tasks consist of goals and objectives, input, activities, teacher role, learner role and settings. According to Ellis (2007), a task involves four key features, focuses primarily on meaning and incorporates some gaps, with participants choosing the linguistic resources required to complete a task which has a clearly defined outcome. In practice, the crux of the lesson is, as the name suggests, the task. All parts of the language used are de-emphasised during the activity to encourage learners to concentrate on the task.

Two misconceptions were evident in this study regarding teachers' perceptions of how second languages are learned: 1) EAL learners should be able to acquire English within two years; and 2) EAL learners should avoid using their first language while they learn English. However, the time needed for full acquisition of a second language depends on several factors, such as age, personality, environment and first-language proficiency (Leung, 2001; Haworth, 2008). Although time-trajectories vary, there is a body of evidence which suggests that full proficiency, including the ability to use English in school and social situations, may take more than seven years (Cummins, 2000).

Some teachers question the utility of EAL learners' continued use of their first language

within school; however, research has indicated the importance of continuing to use one's first language in developing second language literacy (Krashen, 2003). Teachers' misconceptions regarding language acquisition might influence their attitudes towards EAL learners, causing them to misattribute student failure to a lack of intelligence or effort. The findings suggest that it is vital for all teachers of EAL learners to possess a basic understanding of second-language acquisition processes.

2.5.1 Perceptions and attitudes of teachers

In this section, the beliefs and attitudes that state-funded school teachers hold concerning EAL learners, and how these influence teaching and learning, are discussed, as they play a significant role in educational outcomes (Valdes, 2001).

EAL learners' teaching/learning needs in schools, within the UK context, are often not fully acknowledged, and while Oates (2010) has argued against borrowing policies from other nations, UK policy has been limited by current, UK-based research, which is small-scale and restricted in scope. Researchers and practitioners often fail to agree on provisions for EAL children attending UK schools (Safford and Rose Drury, 2013; Haworth, 2008; Blackledge and Creese, 2009). An illustration of this is the concept of removal from the classroom for language study, even though this practice is not officially authorised, as children are expected by the UK government (after the Swann Report in 1985) to be educated in a regular classroom in a state-funded school for the entire school day. However, many schools have withdrawal provisions, which may be a cause for concern, especially from cognitive, social and linguistic perspectives (Alexandria, 1999).

Incorporating EAL students into state-funded secondary-school classes is considered a desirable and vital step towards greater social integration and participation, but this should be complemented by teaching and learning strategies that integrate EAL pedagogy with curriculum content in a structured manner (Davison and Williams, 2001; Leung and Alexandria, 2001). Currently, there is a specific and consistent EAL policy for all primary and secondary schools. However, the EAL policy in the post-16 sector, operating in further education (FE) colleges and other adult education institutions, is referred to as 'English for Speakers of Other Languages' (ESOL). This differs from the provisions developed for schools.

The approaches and behaviours of teachers towards EAL learners influence and reflect the norms and values of society, and the academic environments in which such interactions occur (Mohan et al., 2001). As members of the particular communities in which they live, teachers are influenced by the dominant societal attitudes which, when internalised, are brought directly into schools and classrooms (Mohan et al., 2001). Teachers' attitudes and self-efficacy may directly influence instructional behaviour, which promotes learner outcomes and success (Mojavezi, 2012). For example, teachers with more positive attitudes towards EAL learners are more supportive of first language instruction, and more receptive to the fact that first language learning promotes success in schools (Warschauer, 2005).

2.6 The context

In England, the school census by the Department for Education published in January 2012 showed that one in six primary school learners in England, approximately 577,555 students, are bilingual, while in secondary schools the number of students is estimated to be 417,765, meaning that approximately one in eight is bilingual. These figures have more than tripled compared to previous figures and seem to be a global concern; in contrast, the number of teachers for EAL learners has not risen proportionally (NALDIC, 2012).

The majority of state-funded school teachers have little, if any, training in tailoring their curriculum and teaching techniques to meet the needs of EAL learners (Youngs and Youngs, 2001). Unfortunately, EAL is not a specialist subject in teacher-training colleges, although the adequate support of EAL learners requires specialised teaching techniques. Despite the fact that the number of EAL learners in schools have risen by over 50 per cent since 1997, specialist teacher expertise in schools is increasingly rare. An acute shortage of EAL teachers has been documented, as has the need to provide quality professional development.

The literature suggests that inadequate attention is paid to bilingual or EAL teachers (DfES, 2003; TDA, 2009). In a survey of 156 bilingual teachers, of whom 75 per cent were teaching in bilingual elementary classrooms, only 34 per cent felt that EAL teachers were prepared to teach language-minority learners, while 27 per cent remained indifferent, and 51 per cent were planning to leave their profession within the

next five years (Pampaka, 2012). According to NALDIC (2012), the evidence amassed through national surveys indicates that fewer qualified specialist teachers are now employed to teach EAL learners in UK schools, as in 2008 there were 1,713 teachers, whereas in 2004 there were 2,617.

2.6.1 The deficit perception

Teachers and schools sometimes blame the poor academic performance of EAL learners on their lack of proficiency in English, with poor achievement in examinations and a high likelihood of dropping out of school being widespread among EAL learners (Tett, 2006; Demie, 2001; Strand, 2002). To justify the lower academic attainment of EAL learners, teachers often blame learners' backgrounds, the difficulties they experience outside school, and their parents for not being sufficiently involved in their children's education (Cooper, 2006). In addition, concerns are expressed about cultural differences in EAL learners (Delli Carpini, 2008; Watt and Roessingh, 2009).

The deficit perspective means that attempts to change are misdirected, and are focused on learners, rather than on the institutions that direct their educational choices (Harry and Clinger, 2007). In fact, many EAL learners come from families that strive to ensure that they are provided with opportunities, are highly committed to studying English, and are inspired to achieve academic competence (Suárez-Orozco, 2001). The deficit approach may, as a result, depict EAL learners negatively, while many are, in reality, determined to improve their skills.

Another type of deficit conceptualisation used to explain EAL learner underachievement is the cultural deficit model (Jordan, 2007). This model attributes underachievement to a lack of social acculturation, which is believed to make it too challenging for the existing competencies of an EAL learner to flourish, despite his or her best intentions.

This model originated from deficit perceptions and assumptions regarding the abilities of marginalised learners (MacGahern and Boaten, 2010). The claim is that EAL and other marginalised learners underachieve in schools because they lack cultural capital (Bourdieu, 1997). According to the cultural deficit model, the responsibility for educating learners lies with the learners themselves and their families, rather than with the schools (Jordan, 2009). At the same time, upper and middle class EAL learners,

from affluent backgrounds, may have a greater chance of academic success in formal educational settings because they have more opportunities and resources to develop their cultural capital by comparison with working-class and low-income background EAL learners (González, 2007).

2.6.2 Teachers' attitudes towards inclusion and professional development

EAL learners in the second stage of language acquisition, particularly those in schools with small EAL populations, normally spend the majority of the school day in classes with teachers untrained in working with EAL learners. The attitudes and practices of schools, communities and society shape the opportunities for the success of EAL learners (Nieto, 2002). If society fails to embrace linguistically-diverse learners, then schools and teachers will invariably do so too, impacting negatively on the quality of education that these learners receive (González, 2007).

Although subject-area teachers of EAL learners have seldom been the main focus of research, their attitudes toward EAL inclusion have been explored in various studies in linguistically diverse classrooms (Vollmer, 2000). The experiences of teachers in these studies, although incomplete, provide insights into teachers' experiences with EAL learners. Recurring themes emerge, such as the attitudes of teachers towards including EAL in school classes, views on coursework modification, and feelings of unpreparedness to work with EAL learners (Vollmer, 2000).

The majority of qualitative studies exploring the schooling experiences of EAL learners reference state-funded school teacher attitudes towards including EAL, although there are exceptions. Teachers in these studies were reported to hold negative, unwelcoming attitudes (Schmidt, 2000; Valdes, 2001; Harklau, 2000; Reeves, 2004). Researchers have identified three factors to account for this situation: 1) teachers' perceptions of the impact that including EAL learners will have on themselves; 2) perceptions of the impact on the learning environment; and 3) teachers' attitudes towards and perceptions of EAL learners (Dunne, 2007; Navsaria, 2011; White, 2006).

Teachers are concerned about the chronic lack of time to address the diverse classroom needs of EAL learners (Youngs and Youngs, 2001) and the perceived intensification of teacher workload when EAL learners are taught within classes (Gitlin et al., 2003). Other concerns include feelings of professional inadequacy when working

with EAL learners, and the possibility that EAL learners may hinder class progression through the curriculum (Youngs and Youngs, 2001), triggering inequities in educational opportunities for all learners (Platt et al., 2003; Reeves, 2004; Schmidt, 2000). Evidence of subject area teacher attitudes and EAL learners reveals an unwillingness to work with low-proficiency EAL learners (Platt et al, 2003). In addition, negative ideas regarding the processes of SLA (Olsen, 1997; Reeves, 2004; Walqui, 2000), and misconceptions, both positive and negative, about the race and ethnicity of EAL learners, have been noted as major issues (Harklau, 2000; Valdes, 2001; Vollmer, 2000).

The perception of teachers that they lack adequate training to work with EAL learners is troubling in light of the increasing number of EAL learners. In a study by Valdes (2001), the discovery that most of the teachers surveyed were uninterested in receiving such training was equally concerning. Three possible reasons have been proposed for this ambivalence of teachers towards professional development. Subject area teachers may believe that EAL teachers, rather than general education teachers, are solely responsible for educating EAL learners and, in some instances, subject area teachers have even refused to allow EAL learners into their classes (Valdes, 2001). Researchers argue that, for EAL learners to have equal access to educational opportunities, subject-area teachers must actively participate in the education of all learners, maximising access to content and engagement with learning (Valdes, 2001).

Case-studies of accomplished professional development initiatives for educating EAL learners emphasise the importance of active teacher participation in professional development programmes (Barnett, 2002; Fu, 2003; Gonzalez and Darling-Milambiling, 2002; Schechter and Cummins, 2003). Commitment to school-wide, long-term change, and strong, continuing, university-to-school partnerships is required (Gonzalez and Darling-Milambiling, 2002; Schechter and Cummins, 2003). Success stories emphasise the primacy of locally-devised, context-specific solutions over the importation of solutions from other school settings. However, if teachers believe that no special professional development is needed in order to work effectively with EAL learners, then professional development in this domain will be further challenged (Barnett, 2002).

2.6.3 Implications for the research study

This review of the existing literature has indicated that there are contentions over the effects and impact of using TEL in teaching and learning, specifically when it comes to EAL learners' achievement. While a cross-section of researchers contend that TEL has a positive impact on attainment (Parr & Fung, 2000; Andrews et al., 2002; Cox et al., 2004; Hartley, 2007), others find there is no such impact (Wang, 2005; Beeland, 2002; Keppell et al., 2006; Lui et al., 2006). Standing midway in between this debate are others who claim that the results are inconclusive (Shuib & Azizan, 2015; Ringstaff and Kelly, 2002; Piccoli, 2001). This divisive debate has been a driving force for this study, which explores the impact of TEL on EAL learning in order to identify whether TEL has any positive effects on EAL learners in the subject areas of English, mathematics and MFL.

The key issues for consideration that emerged in the reviewed literature, combined with the potential impact of TEL on EAL learners in the three selected subject areas in Faith Valley School, as noted in Chapter One, led to my exploration of the TEL strategies, pedagogical approaches, instructional practices, methods and resources that teachers use to teach EAL learners in the three subject areas studied. To enhance data triangulation, I also analyse whether TEL positively impacts EAL learners' attainment in exam results. Furthermore, I critically examine whether the school's perception of improved academic performance and learning is at odds with EAL learners' own perceptions of academic success. This has urged me to probe and ascertain the perceived benefits of the use of TEL in teaching EAL learners from the learners' own perspectives. This has led to the formulation of further research questions such as, 'How do learners perceive the benefits of TEL?'

2.7 Chapter summary

In this chapter, the literature on challenges faced by EAL learners and solutions to these challenges has been comprehensively reviewed. Socio-cultural theory has been discussed, and its implications for teaching and learning in the classroom have been explored. A strong theme in the literature is that EAL learner attainment may be improved through the use of TEL depending on the pedagogical approach and its integration in schools.

The chapter deliberated over how English language may be acquired by EAL learners and what implications for teaching/learning processes require consideration. Teachers' perceptions and attitudes towards the inclusion of EAL learners are identified as an important determinant of EAL learners' capabilities. The literature suggests that the 'not too positive' perceptions of teachers significantly influence how these learners are taught, thus affecting their educational outcomes.

The chapter also discussed the impact of socio-cultural perspectives on TEL approaches to learning for EAL learners, illustrating the need to consider shared learning community integration and the different cultural tools and skills of EAL learners. In addition, the chapter explored how EAL learners' attainment may be affected by variables such as identity, language-acquisition stage, and deficit perceptions of state-funded school teachers who teach EAL learners. Overall, the literature review has revealed some of the current struggles to understand TEL teaching and learning in multilingual school environments.

The methods and procedures that will be adopted to gather data for the study will be discussed in the next chapter, where the rationale for selection will be discussed and justified. Strategies used to ensure that the study is responsive to the research questions will be outlined.

CHAPTER 3 - METHODOLOGY

3.1 Introduction

In this section, the procedures, context, underpinning research paradigm, methodology and ethical considerations of the study are outlined: in line with the research questions and objectives. This research is influenced by the perspective that Mercer et al. (2003) presented in their study regarding the use of technology to facilitate teacher-led objectives in the classroom. This is combined with the concept of TEL put forward by Goodyear and Retalis (2010), as the application of technology to improve student learning outcomes or, more specifically, teaching, where technology plays a significant supportive role rather than being a goal in and of itself.

This study sets out to identify and explore a variety of TEL approaches, methods and resources that teachers apply in their classroom practice and contemplates how this may benefit EAL learners (with a specific focus on Faith Valley School in Islington). The research, positioned within a pragmatic paradigm, captures aspects of the experience of EAL learners as they engage with TEL teaching/learning strategies, in response to the research hypothesis that TEL may contribute to improving the achievement and attainment of EAL learners in English, mathematics and MFL.

Interactions amongst learners, teachers and the curricular location are also important factors for consideration (Lincoln and Guba, 2003). Matters considered include the extent to which TEL may facilitate EAL learners' understanding of taught lessons, enabling them to become independent learners and develop transferable study skills that can be applied to other subject areas. The findings may contribute to the successful integration of TEL in the shared learning environments of state-funded British schools, which feature an increasing number of EAL learners, enhancing their attainment and achievement.

In line with the research focus, the study will respond to the following subsidiary research questions:

1. What TEL strategies do teachers use to benefit EAL learners in their teaching of

English, mathematics and MFL?

2. To what extent may the integration of TEL help EAL learners improve their exam results in English, mathematics and MFL?

3. How do EAL learners assess the benefits of TEL?

This research was initiated by a pilot study, following ethical approval, between December 2013 and March 2014. Shaped by a pragmatic research paradigm and explanatory sequential mixed method research design (Creswell and Plano Clark, 2007), data collection was undertaken and completed for the main study by November 2014. The mixed method methodology used to gather data, through methods such as questionnaires, classroom observations, focus group discussions and evaluative tests, located in a pragmatic paradigm, facilitates deeper insight into the potential benefits for EAL learners of the use of TEL in the classroom.

The main study is separated into three phases. The first phase consists of quantitative data collection through learner and teacher questionnaires and evaluative test 1. The second phase involves the consistent, structured introduction of TEL in the three subjects; and qualitative data collection through two focus group discussions and two sets of classroom lesson observations. The third phase focuses on developing an understanding of the potential impact on the exam results of EAL learners after the consistent and structured integration of TEL in English, mathematics and MFL during phase 2. In phase 3, quantitative data is collected through a second set of evaluative tests in the three subject areas. The timeframe leading to the completion of this study is outlined below in Table 3.1.

Table 4.1: A summary of the research approach, questions, methods and data collected in the study

Research phase	Date	Research method	Data sources	Research question number	Emerging data	Findings	Page number in thesis
Pilot study	December 2013	Learner questionnaire (Appendix C1)	Quantitative data - learner questionnaires were completed by 15 EAL learners. Data was collated and coded manually..	1 and 3	The questionnaire was altered for the main study. It emerged that Question 32 was irrelevant. A positive response to the preceding question rendered it redundant; therefore, it was removed from the main study learner questionnaire. The remaining questions worked effectively in eliciting clear responses from participants and were used in the main study learner questionnaire..	Learners highlighted the positive impact of the use of TEL, indicating that TEL was used in the three subjects being studied, especially mathematics. However, the sample size for the learner questionnaire was too small for findings to be generalized: so it was increased from 15 to 50 EAL learners for the main study.	Pages 92
Pilot study	January 2014	Teacher questionnaire (Appendix C2)	Quantitative data - 3 teacher questionnaires were completed by one teacher from each of the three subjects (MFL, English and mathematics). Data was collated and coded manually.	1 and 2	No modifications were made to the teacher questionnaire for the main study. Analysis of data was limited by the small sample size: which was increased to 9 members of the teaching staff, who volunteered to participate in main study (2 teachers and 1 head of department for each subject).	No modifications were made to the teacher questionnaire for the main study. Analysis of data was limited by the small sample size: which was increased to 9 members of the teaching staff, who volunteered to participate in main study (2 teachers and 1 head of department for each subject).	Page 91
Pilot study	February 2014	Focus group discussion (Appendix	Qualitative data from a 50 minutes' focus group discussion with three	1 and 2	Two teachers raised objections about the focus group discussion being audio recorded. Three	Teachers relied heavily on themselves to deliver subject-content through TEL. There was a	Pages 93

		C3)	teachers – one from each of the three subject areas.		question probes were rephrased for the main study to avoid ambiguity and obtain clearer responses. No audio recording was organised for the main study focus group discussions. Data helped provide teachers with a summary of the issues which would be discussed, enabling them to organise their responses. Thus they could actively engage in focus group discussion 1 at the start of the main study.	lack of consistency in integrating TEL to support EAL learners across the school in the three subject areas. For the main study, two focus group discussions with 9 teachers were developed to further explore these findings.	
Pilot study	March 2014	Classroom lesson observation (Appendix C4)	Qualitative data - one 50 minutes lesson observation was conducted in each of the three subjects. Fifteen EAL learners were observed in each lesson.	1 and 3	No changes were made in the observation schedule for the main study. However, to explore findings that emerged from the consistent, structured integration of TEL for EAL learners during phase 2 of the main study, two sets of lesson observations across phase 2 were integrated.	Teachers shared that they did not use TEL in a structured, consistent manner with EAL learners during their lessons. They were willing to embrace more structured, consistent use of TEL in their lessons during phase 2 (July 2014 to October 2014): in order to be a part of the research process, which explored whether the consistent, structured integration of TEL may contribute to improvements in EAL learners' attainment and achievement in the three subject areas.	Page 95
Main study -phase 1	April 2014	Learner questionnaire (Appendix	Quantitative data - learner questionnaires were completed by 50	1 and 3	SPSS software was used for data analysis and applying statistical inferences. Descriptive statistical	EAL learners shared that TEL constructively contributed to academic progress when	Pages 96 - 100

		C5)	EAL learners, aged 13-16, studying the 3 subjects.		tools such as graphs and charts were also used.	combined with engaging teaching/learning strategies. An extensive, eclectic range of TEL was used in the 3 subjects across the school.	
Main study - phase 1	May 2014	Teacher questionnaire (Appendix C6)	Quantitative data - questionnaires were completed by nine teachers (two teachers and one head of department from each of the 3 subjects).	1 and 2	Manual data analysis of questionnaires presented in Chapter 4 confirms that teachers were of the opinion that the structured, consistent integration of TEL could have a positive influence on the learning experience of EAL learners.	Responses from teachers suggested that the structured, consistent use of TEL could contribute to significant positive impact on the achievement and attainment of EAL learners, especially in test results. The consistent, structured integration of TEL was also perceived to improve teachers' instructional skills. However, teachers shared that the integration of TEL did not have a significant impact on improving the attention span of EAL learners.	Pages 96
Main study -phase 1	June 2014	Evaluative test 1 (Appendix L1, L4 and L7)	Quantitative data - three sets of standardised GCSE exam papers (in mathematics, English and MFL) were given to 100 learners who studied all three subjects. In all, 100 learners in total (50 EAL and 50 first-language-English-	2	Evaluative test 1 provided a point of reference to judge the academic ability of EAL learners in comparison to their English as first language peers. The results were used for determining whether the consistent, structured integration of TEL, during phase 2, had a positive impact on EAL learners' results.	Evaluative test 1 in the three subjects was taken before the structured, consistent use of TEL was introduced in phase 2. The results showed that first language English speakers outperformed their EAL peers. Their test results in English, mathematics and MFL were significantly higher than those of the EAL learners. In	Page 116

			speakers) completed the 3 test.			English, there was a substantial gap between EAL learners and their peers who were proficient in English as a first language.	
Main study –phase 2	July 2014	First set of lesson observations (Appendix C9)	Qualitative data - a total of three 50-minute lessons observations were conducted during one day in July 2014. Fifty EAL learners were observed in one mathematics, MFL and English lesson.	1 and 3	Each classroom observation was guided by the planned integration of TEL, to facilitate the achievement of anticipated learning outcomes that were curriculum related and explicitly defined for the lesson. The following three areas were considered in each observation: 1) Implementation of the planned use of TEL by the teacher; 2) Efforts of teachers and learners to complete teaching/learning using TEL; 3) Overall learner engagement in the classroom. Data has been presented in narrative and bar charts.	Teachers used diverse TEL strategies in instruction to deliver the content of what was being taught. Particular attention was given to consolidating learning and providing constructive feedback to EAL learners on their TEL based learning. Teachers were not consistently integrating TEL to facilitate learning outcomes in a clearly structured manner. TEL use was not planned to be responsive to and match specific needs and abilities of diverse EAL learners in the classroom. Peer discussions and group activities did not always use any form of TEL to improve engagement in the learning process. A second set of classroom observations, following a period of consistent, structured integration of TEL for EAL learners in classroom practice during phase 2, was planned for August 2014.	Pages 107 - 116

Main study –phase 2	August 2014	Second set of lesson observations (Appendix C10)	Qualitative data - a total of three 50-minute lessons observations were conducted during one day in August 2014. The same fifty EAL learners were observed in the same mathematics, MFL and English classroom- based lessons.	1 and 3	Significant events related to the interaction between EAL learners and teachers and their engagement with TEL during lessons was recorded. The second set of observations allowed for data triangulation and confirmed that the consistent, structured use of TEL teaching/learning strategies enhanced the learning process for EAL learners.	Findings suggest that the benefits of employing TEL in a structured, consistent manner to teach EAL learners motivated teachers to use it. Teaching practices and content took into consideration the use of TEL appropriate for EAL learners. These learners were engaged in the lessons, purposefully provided with TEL resources, and made progress at their pace. Content and organisation of lessons, integrating TEL, matched the expected learning outcomes in the observed lessons.	Pages 107– 116
Main study –phase 2	September 2014	Focus group discussion 1 (Appendix C7)	Qualitative data from the focus group discussion was collected from nine teachers (two English teachers, two MFL, two mathematics teachers and three heads of department, one for each of the 3 subjects).	1 and 2	The outcome of the exploratory discussion provided a deeper level of understanding of teachers’ perspectives on how the use of TEL may influence teaching/learning for EAL learners. The shared experiences of teachers in using TEL with EAL learners at the start of phase 2 was also covered.	Focus group discussion 1 confirmed that a range of TEL resources and activities were being integrated in classroom practice. However, teachers believed they were not adequately trained in the use of TEL. They mentioned they had only received initial training in the use of ICT; and relied on teacher training and curriculum websites, their initiative and other devices for delivery of the curriculum through TEL. On the whole, teachers persisted in working with TEL, despite challenges, because they	Page 102 - 105

						regarded the use of TEL in lessons as a positive practice for enhancing learning outcomes of EAL learners.	
Main study –phase 2	October 2014	Focus group discussion 2 (Appendix C8)	Qualitative data for focus group discussion 2 was collected from the same research participants who participated in focus group discussion 1.	1 and 2	The findings from focus group discussion 1 were drawn on to shape focus group discussion 2. For example, teachers’ expectations shared during discussion 1 were reviewed and reflected upon. Teachers were positive about the use of TEL in lesson delivery to benefit EAL learning.	TEL was extensively incorporated, in a structured, consistent manner, in lessons for EAL learners. Teachers discussed the positive contribution of TEL to EAL learners’ progress and active engagement in lessons. A need for more classroom support assistants for EAL learners was highlighted.	Page 105 - 107
Main study –phase 3	November 2014	Evaluative test 2 (Appendix L2, L5 and L8)	Quantitative data - three sets of standardised GCSE exam papers in mathematics, English and MFL (different from evaluative test 1) were given to the same 100 learners who had initially completed evaluative test 1. This comprised 100 learners who studied all the subjects (50 EAL learners and 50 non EAL learners in each of the three subjects).	2	Evaluative test 2 was completed after TEL had been consistently integrated in teaching/learning practice with EAL learners across the 3 subjects during phase 2.	Results revealed a significant narrowing of the gap in results between the two groups. EAL learners performed better after structured, consistent use of TEL than in their initial tests.	Pages 116 - 122

3.2 Context and justification

The research was conducted in a larger than average, state-funded comprehensive secondary school for boys. The justification for the selection of the school lay in its location in the London Borough of Islington, which has a huge EAL learner population. The borough has one of the highest numbers of EAL learners (51 percent in the secondary school sector, compared with the London average of 36.3 percent) (CSA, 2011). The school is a computing and mathematics specialist school, challenged by the issue of equity in EAL learner attainment and achievement. Having invested heavily in TEL infrastructure and teaching/learning resources, it claims to have a positive culture, highly supportive of learners. The school aims to promote academic excellence: with a particular emphasis on integrating best classroom practice, inclusive of TEL, responsive to the needs of EAL learners (Faith Valley Ofsted Report, 2012).

This research attempts to establish the impact that structured and consistent use of TEL has on learning outcomes for EAL learners; and thereby inform practice at Faith Valley School. The research questions identified thus attempt to explore and assess how well the TEL approaches taken across the school serve to benefit EAL learners in the three subject areas. The population of Islington's schools is likely to be replicated in other areas if current levels of immigration continue; the research findings could therefore contribute to insights in other London areas, and provide a useful guide for supporting EAL learners in other state-funded British schools.

3.3 Pragmatic paradigm and mixed method research

Bryman (2004, p. 453) identifies a paradigm as a cluster of beliefs and dictates influencing what should be studied, how research should be done and how results should be interpreted. Social life cannot be studied without a guiding theoretical scaffold or paradigm (O'Brien, 1993). Paradigms are world views or belief systems that reflect and guide the decisions that researchers make (Tashakkori and Teddlie, 1998). A paradigm provides a general framework: serving a set of assumptions about the nature of reality steering the study; and defining its characteristics along the dimensions of ontology, epistemology and methodology (Terre Blanche and Durrheim, 1999).

Traditionally, paradigms have frequently been placed in opposing positions, under categorisations of interpretivist or positivist research, using a variety of terminology (Guba and Lincoln, 1988; Tashakkori and Teddlie, 1998). There has been a longstanding debate about the dichotomy of paradigm positions and their impact on the relationship between paradigm and (Burrell and Morgan, 1979; Creswell, 2003). The relationship between research design approach and underlying paradigm position is by no means fixed (Bryman, 2004).

This mixed method research study is responsive to arguments challenging the 'pureness' of mono-methodological research positions in positivist and interpretivist paradigms. The study locates itself in a pragmatic paradigm, enabling the research to pursue research questions which do not fit clearly and comfortably within a purely interpretivist or positivist paradigm and research design (Fendt et al., 2008). As Darlington and Scott (2002) note, the choice of research approach can be shaped and informed by the researcher's belief in a design methodology which is best suited to the purpose of the study. As a set of beliefs, the pragmatic paradigm is pluralistic and favours an integration of positivist and interpretivist positions within a mixed method research design (Creswell, 2003).

A pragmatic paradigm facilitates the use of mixed method research, as it enables a focus on the researcher's values to determine 'what works as the truth regarding the research questions under investigation' (Tashakkori & Teddlie, 2003, p. 713); and 'sidesteps the contentious issues of truth and reality' (Feilzer, 2010, p. 8). A pragmatic paradigm facilitates data and method triangulation and the integration of multiple perspectives and values (Owuegbuzie and Leech, 2005; Fendt et al., 2008). Quantitative research methods tend to be associated with a positivist research paradigm. By contrast, a qualitative research approach is often connected to an interpretivist paradigm. However, a pragmatic paradigm facilitates using quantitative and qualitative methods in a manner that fits best with the emphasis of research questions (Creswell, 2003).

Tashakkori and Teddlie (2003) note there are three areas where a mixed methods research study allows for more flexibility. First, mixed method research can be responsive to both confirmatory and exploratory questions. Second, it may enrich and deepen the endeavour to understand the complexity of social phenomena through data

analysis. Third, it may provide for an expression of differing viewpoints to emerge through divergent findings (Tashakkori and Teddlie, 2003).

The rationale for selecting a pragmatic paradigm to explore potential benefits in the use of TEL for improving the attainment and achievement of EAL learners in mathematics, English and MFL stems from how the nature of reality is understood in the context of this study: leading to the questions raised by this research (see Chapter One). The pragmatic paradigm is based on a non-singular reality ontology (Kivunja and Kuyini, 2017). Ontologically, this paradigm shapes the research, as it is based on the hypothesis that the potential of a structured, consistent approach of TEL teaching/learning practice to support EAL learners can exist and be studied. However, there may be a variety of learner and teacher perspectives on how this may be made possible.

As a researcher, I am aligned with the relational epistemology of a pragmatic paradigm (Kivunja and Kuyini, 2017), which enables me to research the reality of TEL practice and its integration in supporting EAL learners in the three subject areas. Objective and subjective research positions and relationships are selected as they are deemed appropriate for identifying findings that may contribute to improving learning outcomes for EAL learners (Kivunja and Kuyini, 2017). As I reflect on the limitations of my practice, the belief underpinning this study is that I will present objective and subjective knowledge of the relationship between some TEL practice and positive learning outcomes that exist in Faith Valley School to support EAL learners. This may allow the study to be replicated as a generalisable multi-layered reality that may exist in other contexts.

This study applies a pragmatic approach to methodology, which involves using the method which appears best suited to the research focus and question (Johnson and Onwuegbuzie, 2004). A mixed method research approach involves collecting, analysing and integrating quantitative (questionnaires and evaluative tests) and qualitative data (focus group discussions and classroom observations). The approach adopted draws on Creswell and Plano Clark (2007) by using an explanatory sequential mixed method research design, to explore the hypothesis that the integration of a structured, consistent TEL approach in teaching/learning practice may benefit EAL learners' outcomes in the three subject areas. The emphasis on the participants'

school and classroom-based reality, as a conducive and enabling learning environment, facilitates an interpretation of data inclusive of the perspectives of teachers and learners, to produce findings responsive to the hypothesis.

According to Maxwell (2002), generalisability can be equated with external validity, whereby findings from a particular study or population are applied to people or settings other than those closely considered. Comparatively, according to Seale (1999), transferability is achieved by providing detailed, rich descriptions of the research process settings or people studied:

Through a pragmatic lens and an explanatory sequential mixed methods research design, the possibility of generalisability and transferability may be realised in this study. In addition, the conventions outlined by Woods (1999) were followed; and document analysis (evaluative test results), questionnaires, focus group discussions and classroom lesson observations were used to reveal the 'habitus' of the EAL learners, and convey a sense of the environment in which they are studying. The school is representative of typical London secondary schools regarding learner selection, size, teaching/learning issues and challenges encountered by state-funded schools in London with a high proportion of EAL learners (Arnot, 2014; NALDIC, 2010).

Despite some level of generalisability and transferability to the context of other London state-funded schools, the research is nonetheless limited. Some issues may restrict its broader influence, the first of which could involve the potential negative perceptions and attitudes of teachers. Though nine teacher participants (inclusive of three head of departments) volunteered to participate in this study, other teachers may be sceptical, believing they may end up under scrutiny and judged on their knowledge, skills and teaching techniques. Some may have also felt that taking part would add to their already large workload.

The threat of introducing biases and distorting findings was also present. As an ICT subject leader, line manager, and the school ICT coordinator, how teachers and learners related to me regarding information disclosure (such as responses to questionnaires, observations and focus group discussions) represented prospective challenges to data integrity. Mixed method research data accessed over an extended period by the researcher, an insider, has been selected to minimise research bias. This

has been responded to through data and method triangulation; in the recognition that mixed methods are best employed within ethical boundaries which serve to protect the research process from being unconsciously contaminated by pre-existing beliefs (Gray, 2013; Spector, 2006; Onwuegbuzie, 2007).

3.4 Research methodology, design and methods

3.4.1 Research approach

As mentioned previously, I am an insider researcher at the school. My professional role may present particular challenges that need to be taken into consideration (as outlined above and in Chapter One). Nonetheless, in the context of exploring and drawing out best practice, this may also be viewed as an advantage (Costello, 2005). For instance, the use of a researcher affiliated with the school may allow for the integration of longer-term observations and the gradual building of a deeper relationship of trust with staff when investigating their practices (Berg, 2004). This may be hugely valuable when undertaking a future action research study (Seidman, 2013). This is particularly true given that the goal of action research is to not only research, but also put in place action emerging through the cycle of inquiry (Kemmis and Wilkinson, 1998; Bradbury, 2008).

This study has not located itself in action research but adopted the pragmatic paradigm, making use of the explanatory sequential mixed method research design. Nevertheless, it will explore the issue of improving EAL learners' academic performance in English, mathematics and MFL through structured, consistent use of TEL. Hence, data collection and analysis could inform an action plan that can be implemented, evaluated and restarted within the same institution. Findings and models will be developed further, within Faith Valley School, beyond the thesis. The action plan is not presented in this study. However, on completion, this research will form the basis for developing one, which will be further explored through future research.

Drawing on the outlined cycle of inquiry, the potential of an insider researcher such as myself to have full access over a long period of time can contribute to both iterative and transformational change through a process of ongoing research that extends beyond the foundation developed through this research study (Kemmis and Wilkinson,

1998; Reason and Bradbury, 2008). Action research, as an endeavour, is rooted in action learning (Zuber-Skerritt, 2001). Action learning 'means learning from action or concrete experience, as well as taking action as a result of this learning. Similarly, action research is a cyclical iterative process of action and reflection on and in action' (Zuber-Skerritt, 2001: 2). Aligned with the action research approach, this study aims to contribute to the practical improvement of TEL practice in the classroom, and enhance teachers' understanding of TEL practice: so improving outcomes for EAL learners, with a specific focus on the three subject areas in question.

3.4.2 The explanatory sequential mixed method research design

The mixed method methodology for this study is developed through an explanatory sequential research design. Quantitative data was collected using learner and teacher questionnaires and evaluative tests. It was analysed and complemented with qualitative data gathered from focus group discussions and classroom observations. Traditionally, this is a two-phase research design: quantitative data is collected first, followed by qualitative data. This research design was chosen so that the qualitative results could be used to delve more deeply into explaining and interpreting the quantitative data. For instance, teacher questionnaires were used to collect quantitative data; but later, research participants who completed the teacher questionnaires were selected for focus group discussions to offer further insights into some of the findings that emerged as areas of focus from their completed questionnaires.

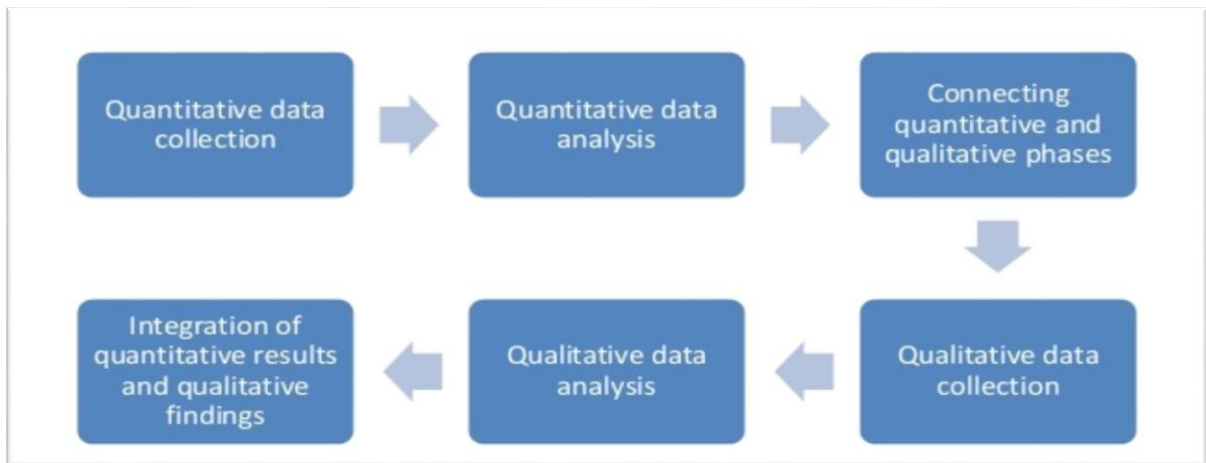


Figure 4.1: Explanatory sequential design (Subedi, 2016: 570-577).

An explanatory sequential mixed methods research design, according to Creswell and Plano Clark (2011), consists of collecting first quantitative data, then qualitative data, to help explain or elaborate on the quantitative results. The rationale is that while the quantitative data and results provide a general picture of the research issues, more analysis, specifically through qualitative data collection, is needed to refine, extend or explain the general picture (Creswell and Plano Clark, 2011). As in any explanatory sequential mixed methods design, it is necessary to deal with the prioritisation, implementation, and integration of the quantitative and qualitative approaches.

Thus, there was the need to consider which approach – quantitative, qualitative, or both – had the greater influence in the study design. It is also necessary to establish the sequence of the quantitative and qualitative data collection and analysis, and decide where mixing or integration of the approaches occurred in the study; and find an efficient way to visually represent all nuances of the design for conceptual purposes, and provide for its better comprehension. In resolving these issues, decision-making was guided by the purpose of the study and its research questions, as well as methodological discussions in the literature (Morse, 1991; Morgan, 1998; Tashakkori and Teddlie, 1998; Creswell, 2003).

In adopting the explanatory sequential design, there is also the issue of priority: the question of which approach should be given more weight or attention during the

process of data collection and analysis (Morgan,1998; Creswell, 2003). This decision may depend on the interests of the researcher, the audience for the study, and what the researcher seeks to emphasise (Creswell, 2003). In sequential explanatory design, priority is typically given to the quantitative approach: because the quantitative data collection comes first in the sequence and often represents the dominant aspect of the mixed methods process. The smaller, qualitative component follows in the second phase of the research. However, depending on the study goals, the scope of quantitative and qualitative research questions, and the design of each phase, a researcher may give priority either to the qualitative data collection and analysis (Morgan,1998), or to both. Such decisions could be made either at the study design stage before the data collection begins; or later, during the data collection and analysis process.

A final, third phase was added to this design: which involved quantitative data collection through a second set of evaluative tests, after qualitative data collection and analysis was completed, to provide data-based evidence responsive to the research focus on understanding whether the consistent, structured integration of TEL may contribute to an improvement in the English, mathematics and MFL examination results of EAL learners (see Table 3.1). This still fits with Creswell and Plano Clark (2011)'s assertion that in a mixed method research design, different approaches can be used to focus on the same phenomenon; and when it provides similar findings, there is 'corroboration', which suggests that the evidence generated is trustworthy. An essential reason for using explanatory mixed research design in this study was to complement one set of results with another, expand a set of results, and discover something which would have been missed had only a quantitative or a qualitative approach been used.

EAL learner participants selected for the study numbered 50 in total; and there were nine teacher participants (six teachers and three heads of department for the subjects under study). All were from Faith Valley School. Co-operation of the school helped ensure high response rates; it seems probable that the relationship of trust that existed regarding the research created quality responses.

The 50 EAL learners were purposefully selected because they represented the body of learners at the school and access existed to gain consent (Appendix E3 and E4). In

particular, they represented different stages of language-acquisition. Their test scores over the previous six years had been lower than those of their first language English speaking peers. They all studied English, mathematics and MFL. They ranged from 13 to 16 years of age. They were invited to take part in study questionnaires, lesson observations and document analysis (evaluative tests).

The nine teachers involved were 6 teachers and 3 heads of departments in the three subject areas under study. All of them responded to teachers' questionnaires and participated in focus group discussions and some of them took part in lesson observations.

As a general rule, concern might exist that participants might tailor causal attributions to the researcher's interests (Onwuegbuzie and Collins, 2007; Norenzayan and Schwarz, 1999), but knowledge of the school allowed the researcher to effectively evaluate the risk of bias from this source. In addition, the samples for the pilot and main study were sufficiently similar that both could offer insights into the culture of the institution (Onwuegbuzie and Collins, 2007).

Participants in the questionnaire portion were selected using purposive, homogeneous sampling (Holloway and Wheeler, 1995). A homogeneous sample is used when the researcher wants to examine a particular phenomenon: in this case, TEL use by EAL learners. As purposive sampling and, more specifically, homogeneous sampling target individuals from a specific subculture, it was the most appropriate approach with which to study EAL learners (Ritchie, 2003).

Qualitative aspects encompassed focus group discussions and lesson observations. Qualitative research uses non-probability sampling, in which units are deliberately selected (Ritchie, 2003). Its purpose is to examine participants using specific criteria, rather than focus on statistical representation (Kothari, 2004). In this case, the objective was to respond to the research questions about Faith Valley School. Purposive sampling was also used for qualitative data collection (Denscombe, 2014). 50 EAL learners were observed in two sets of lessons at different times in all three subject areas (English, mathematics and MFL). Interactions between teachers and EAL learners were also observed in lessons. In addition, nine teachers (six subject teachers and three heads of departments) of mathematics, English and MFL were

involved in the focus group discussions.

3.4.3 Questionnaire

Questionnaires were completed by 50 EAL learners aged 13-16 years, and by nine teachers (two teachers from each of the subjects and three heads of department). For the EAL learners involved, the study sought to establish whether using TEL enhanced their learning. It was necessary to determine what types of TEL were used and whether learners felt it made them more independent; as well as study whether strategies adopted by teachers were effective.

The learner questionnaires provided vital information about learners' perceptions, asking primarily for general information on TEL use concerning attitude and attainment. The questionnaires required 20-30 minutes each to complete; learners were allowed to take them home for parents to assist them in organising their responses. The questionnaires were stored in an anonymised form to minimise ethical concerns regarding confidentiality. The teacher questionnaire was slightly shorter and asked participants to reflect on their teaching approaches using TEL. All questions in both questionnaires were closed, requiring a yes/no or 'check all that apply' response (see Appendix C5 for learner questionnaire and Appendix C6 for teacher questionnaire).

3.4.4 Focus group discussions

Focus group discussions require significant preparation. Questions need to be asked in a particular manner to obtain focus-related responses and avoid bias. McNamara (2009) includes eight principles in the preparation stage. These are: 1) choosing an appropriate setting; 2) explaining the purpose; 3) discussing confidentiality; 4) explaining the format; 5) indicating the length of time; 6) providing researcher contact details; 7) asking for questions before commencement; 8) using some discussion-recording process. In addition, Creswell and Plano Clark (2007) suggest it is essential for participants to be carefully selected. In the case of this research, participants were limited to those who contributed to the study; and all nine teachers (six subject teachers and three heads of departments) were selected because they were involved with teaching English, mathematics and MFL to EAL learners.

Creswell (2009) further notes that participants must be willing to share their stories. As an inside researcher, I gradually built a rapport with participants working at Faith Valley School. Their willingness to share was recognised through the pilot study process. The selection ensured a range of opinions which meant that a broad spectrum of experiences could be discussed; and mitigated the trap of conclusions based on experiences in one particular subject area at the exclusion of the other two. The focus group discussions were conducted over two 50-minute sessions, a month apart.

According to Shneiderman and Plasiant (2005), focus group discussions can also help the researcher to probe a concern, leading to focused findings. The main advantage of this method is that it may enable the researcher to obtain detailed, qualitative, data-rich information (Miles et al., 2013; Kaplan and Maxwell, 2005).

I used semi-structured probes, asked one at a time, to provide participants with the chance to elaborate and facilitate a focused, more consistent discussion (McNamara, 2009). I grouped participants into focus groups, primarily because people in the group were able to develop and express ideas which they may not have considered alone (Shneiderman and Plaisant, 2005).

The contributions of participants in the focus group discussion were recorded through written notes. This was again considered in light of the need to avoid participants developing a good-participant or apprehensive-participant role (Berg, 2004). In this case, the status of the researcher was an advantage. It was possible, through triangulation of data such as lesson observations and participant-observer knowledge, to confirm the veracity of the statements regarding practice within the school. The handwritten notes anonymised.

3.4.5 Lesson observations

In this study, six classroom lesson observations were conducted in English, mathematics and MFL classes. The breakdown of the six lesson observations carried out were: two lesson observations in English, two lesson observations in mathematics and two MFL lesson observations. In total, 50 EAL learners were observed in the three subjects, each observation lasting 50 minutes. Observations were undertaken by the researcher and focused on how learners used and engaged with TEL in lessons .

These observations were also contextualised by a review of the evaluative test results.

Each class selected in the three subject areas was observed twice, with a one-month interval between the two sets of observations. It was important to carry out two separate lesson observations at different time periods for each subject, so that observations would be recorded in two sessions. This allowed for developing an understanding of any developments that may have occurred during the consistent, structured integration of TEL in phase 2 of the study.

Data collected in the first set of lesson observations helped with mapping possible key factors in the following 1) implementation of the planned use of TEL by the teacher; 2) efforts of teachers and learners to complete teaching/learning using TEL; 3) overall learner engagement in the classroom. Lesson observations allowed for data triangulation and confirmed that the consistent, structured use of TEL teaching/learning strategies enhanced the learning process for EAL learners.

To address any issues of potential bias, the observations were supported with method triangulation through the incorporation of focus group discussions, evaluative tests and questionnaires (Corbin et al., 2014; Tong et al., 2007). Moreover, it is essential to examine the extent of researcher participation within the observation process. While there are typically four roles that the researcher may adopt (complete participant, participant as observer, observer and participant, and complete observer), I was a participant as observer in the classroom lesson observations (Merriam and Tisdell, 2015). I was also an employee within the same institution. That I was a participant could potentially affect how research participants may perceive me and how I may perceive them (Bonner and Tolhurst, 2002). However, having insider status as a practitioner can also make the observation process more comfortable and natural for research participants. It is not unusual or inappropriate for me to attend and observe lessons at the school.

Given this, the decision was taken to use note-taking to record data and thereby maintain a more natural class environment. Notes were shared with the class teacher involved for validation and to ensure that no pertinent practices and learning interactions were missed. Furthermore, using a variety of data collection methods and approaches to analysis contributed to triangulation and thus to the reliability and

validity of the research findings.

3.4.6 Evaluative testing

One of the primary purposes of this research was to consider whether the consistent and structured integration of the use of TEL, as a facilitative tool in teaching and learning, could impact the examination results of EAL learners. I anticipated that testing learners before the introduction of concerted, consistent TEL in the three subject areas would provide a clear picture of any difference between their results and their non-EAL peers. This could also provide a basis to compare results after the completion of phase 2 (Figures 4.4, 4.6 and 4.8). A second set of tests, performed in phase 3 (Figures 4.5, 4.7 and 4.9), aimed to reveal whether there had been improvements in the results of EAL learners.

Before phase 2, all 100 learners of the (EAL and non-EAL learners) were tested in mathematics, MFL and English, using standardised GCSE exam papers. After the introduction of a structured, consistent approach to the use of TEL in the three subjects during phase 2, all participating EAL learners took a second test in phase 3 (Figures 4.10, 4.11 and 4.12). Each test lasted approximately 50 minutes. In all, 100 learners (EAL and first language English speakers) completed the English test; the MFL test; and the mathematics test (see Chapter 4).

Regarding ethical considerations, one issue that could have influenced the findings was whether the participants had seen the tests: as these were already available online. However, this was unlikely; the tests used were part of the GCSE preparation process, and participants had not yet begun practising for their GCSE exams.

3.5 Data analysis

Data analysis focused on the impact of TEL on EAL learners and teachers in English, mathematics and MFL, by quantifying and summarising the numerical data for questionnaires and tests; and expressing the results statistically. Thanks to this procedure for analysis, I was able to regard TEL use as consisting of observable, measurable facts (Hernández-Ramos et al., 2014; Agyei and Voogt, 2011).

As part of the process, notes were maintained on the researcher's reactions and ideas which may have impacted on the analysis process. I also needed to consider issues

of reliability and validity. Reliability can be defined as 'the extent to which results are consistent over time and an accurate representation of the total population under study. If the outcome of a study can be replicated using the same methodology; then the research instrument is reliable' (Joppe, 2000, p.1). The research participant representation of EAL learners in an inner-city London school and a mixed method research approach, facilitating data and method triangulation, contributed to the reliability.

Ascertaining validity is slightly more challenging. Joppe (2000: 1) defines validity as the degree to which 'research truly measures that which it was intended to measure or how truthful the research results are'. The instruments created for this study were piloted, which enhanced its validity. In addition, construct validity, which determines what and how data are collected (Golafshani, 2003), was considered. Thus, it is believed that what was intended to be measured through questionnaires and evaluative testing was measured, leading to an understanding of how TEL practice may contribute to the improved learning experience, and thus, attainment of EAL learners in state-funded secondary schools. Teacher participants' validation of focus group discussion findings and observation notes contributed to the validity of the qualitative data.

Quantitative data was checked for possible errors and omissions, and to ensure consistency. Coding was done manually for the qualitative data; SPSS software was used for quantitative data analysis. Data were collated in tabular, graphical and narrative form. In analysing the quantitative data, descriptive statistical tools such as bar graphs, line graphs and pie charts were used. Qualitative data was presented using written text. (Silverman, 2006; Leech, 2007).

In response to the primary research focus - to explore the possible impact of TEL in improving the attainment and achievement of EAL learners in English, mathematics and MFL - the triangulated, mixed method research data suggested that English, mathematics and MFL teachers used some effective TEL strategies with EAL learners. Teachers mainly used TEL strategies to explain tasks and classwork to the learners. Teachers and learners both indicated that the most influential TEL practices involved explaining new ideas and concepts that facilitated classwork, different tasks, homework and extra learning. EAL learners and teachers maintained a positive attitude

towards engaging with TEL, particularly in mathematics (this is further explored in chapters four and five).

3.6 Ethical considerations

A central component of any research study lies in addressing the ethical issues associated with the research. The job of the researcher is to outline the nature of the research and provide an assurance that ethical guidelines have been considered. Creswell (2013) offers a useful guide to ethical requirements associated with social science research, arguing that a beneficial research question is necessary for any research to be conducted. He suggests that the study should benefit participants and represent a valuable contribution to knowledge (Creswell, 2013).

This research benefits the participants by providing insight into the way TEL is used in teaching/learning practice, while giving them the opportunity to reflect on EAL learners' challenges. With the growing population of EAL learners in secondary school classrooms, there is a need to understand TEL strategies that can assist them in their learning process.

Silverman (2000) cautions that researchers should always be aware of what they are doing and remember that, while conducting research, they confer a level of risk, however low, to research participants. The researcher must respect the rights, needs, values and desires of participants (Creswell, 2003). Ethical issues should be considered when collecting, analysing and interpreting data (Miles et al., 1994). The relationship between researcher and participant should be considered in terms of the values and cultural aspects of the researcher (Silverman, 2000). Anderston and Arsenault (1998) provide an excellent summary, stating that informed consent will require an understanding of the purpose, risks and benefits of the research, their rights as study participants, and their ability to reject their participation. All participants were informed about the purpose, nature and data collection methods prior to the start of the study (Appendices F1 and F2).

To address the confidentiality and anonymity of participants, the study ensured that any identifying characteristics of participants on questionnaires, evaluative tests, focus group discussions and lesson observations would be removed. At the start of the

research, it was made clear to all participants that names would not be disclosed, nor information shared that might reveal their identity. No participant was forced to engage. It was made clear to every participant that the research was purely for academic purposes. Participation was voluntary. It was stressed to participants that choosing not to participate would not have any negative impact on them at the school. This was particularly important given that the researcher held a practitioner role within the school.

The main ethical issues that arose were those around the power dynamics between the researcher, teachers and learners. The question of participant compliance due to possible interference caused by the researcher's role as an insider and ICT teacher meant several potential issues, including the possibility that the participants might feel pressured to give answers designed to please the researcher. This also introduced issues of compulsion in participation in the research itself, and the risk that participants (teachers and learners alike) might feel that they must participate.

As such, there was the need to guard against some degree of demand characteristics (Weber and Cook, 1972). The personal acquaintance between researcher and participant could potentially have resulted in participants either playing a 'good participant role', where they attempted to validate the researcher's hypotheses; or an 'apprehensive participant role', resulted in an unwillingness to discuss the subject openly to avoid the disapproval of the researcher (Weber and Cook, 1972). It was also made clear that teachers and EAL learners did not have to participate; and could refuse to do so without any repercussions if they wished.

The choice of language used was also important. Both staff and learners were informed that the study aimed to investigate how they could be more effectively helped, rather than how they themselves could improve. In general, heavy emphasis was put on participants not being judged.

These ethical considerations also influenced how the research focus and questions were developed. Active consideration of risks and benefits to the professional development of participants, the institution, learner welfare and researcher were prioritised at each stage of the process (Kastanakis and Voyer, 2014). Participating teaching staff and EAL learners were requested to give feedback on parts of the

preliminary report which emerged from this study, as it represented their perceptions, attitudes and context. The needs of EAL learners were further explored following completion of the study, through discussion of the research findings with staff who had relevant specialist training and knowledge of EAL issues.

3.7 Chapter summary

In this chapter, the methodology underpinning the research focus and questions were considered. A pragmatic paradigm was adopted; and an explanatory sequential mixed method research design is used to gain more robust insight into the study questions being explored. Ethical concerns, reliability and validity issues have also been outlined.

CHAPTER 4: DATA PRESENTATION AND DISCUSSION

This chapter presents and discusses the data that has been collated for this research study. The mixed method research data, to explore the impact of TEL on EAL students' learning experience in English, mathematics and MFL, has been gathered from six Faith Valley School teachers, three HODs and 50 EAL learners through questionnaires, focus group discussions, lesson observations, and evaluative tests. The research study consists of a pilot study and three phases for the main study. The pilot study was initiated in December 2013 (following ethics approval) and ended in March 2014. The pilot study consisted of teacher and learner questionnaires, a focus group discussion and three lesson observations (one in each of the three subjects). Phase 1 of the main study started in April 2014 and ended in June 2014. Phase 1 of the main study consisted of quantitative data collection through teacher and learner questionnaires and evaluative test 1. Phase 2 of the main study started in July 2014 and ended in October 2014. Phase 2 of the main study consisted of qualitative data collection through focus group discussions and lesson observations. Phase 3, the last part of the main study, consisted of quantitative data collection, through evaluative test 2, during November 2014. The data presentation and discussion for evaluative test 1 and evaluative test 2 is combined together in section 4.5.

4.1 The pilot study

4.1.1 Pilot study teacher and learner questionnaires

The pilot study started with teacher and learner questionnaires. Three teachers, one from each subject, were invited to complete teacher questionnaires. Fifteen EAL learners were invited to complete learner questionnaires. The purpose of both questionnaires was to determine the appropriateness of the research instrument. Both teacher and learner questionnaires required quantifiable responses in the form of either a 'yes or no' response, and a select options from a list using a 'check all that apply' approach.

Participants in the teacher pilot questionnaire were asked a series of 10 closed-response questions that took them a maximum of ten minutes to complete, as their intensive workload was taken into consideration. Teachers' responses to the pilot questionnaire provided insight into their perceptions contributing to consistent and structured incorporation of TEL into teaching and learning practice during phase 2 of the study. Teachers also shared their perspective on the possible impact of TEL on the attainment of EAL learners. Received responses were positive, indicating that the three teachers believed that TEL could generate positive outcomes for EAL learners, studying their taught subjects, if relevant teaching/learning strategies were employed. Based on the results and feedback of the teacher participants all ten questions were used in the main study questionnaire. One reason for this was that none of the three participants chose the option of 'other' in their responses to questions that asked them to 'check all that apply'. Consequently, the lists of potential options were deemed appropriate. Significant statistical analysis could not be developed due to the small sample size. The value for Cronbach alpha analysis was -4.714, making results insignificant for a quantitative analysis. This led to the conclusion of a need to increase the sample size and a total of nine teaching staff in the three subjects volunteered to participate in the main study (see Appendix M2: Data Analysis Teachers Reliability Statistics).

In contrast 15 EAL learner participants were asked to answer 32, mainly, closed questions (see Appendix C5). This rendered the data analysis straightforward and offered learners a level of consistency. The pilot questionnaire took a maximum of approximately 30 minutes to complete, an appropriate length of time for the EAL learner participants. Question 32, 'Why is it difficult for you to use TEL skills gained in other subject-areas? Please give reasons', proved problematic, as none of the 15 participants chose to respond. However, all 15 participants answered 'yes' to the previous question, 'Are you able to use TEL in other subjects?'. Since question 32 proved awkward as it was not responded to and it was the only question that was not closed and eliciting a quantifiable response it was removed from the main study questionnaire. Findings from the data collected from learners presented the positive impact of the use of TEL: demonstrating its use in lessons in the three subjects (especially mathematics), and adoption in other lessons across the school. EAL learner participants confirmed the findings from the teachers' responses, unanimously agreeing that TEL was used to complete class tasks, explain ideas and concepts, and in extra learning. Despite these findings, significant statistics could not be developed due to a small sample size. There was thus the need to increase the sample size in the main study to ascertain the impact of TEL (Appendix M1: Data Analysis Learners reliability Statistics).

4.1.2 Pilot study focus group discussion

In this study, a semi-structured focus group discussion approach was adopted, whereby three teacher participants (one from each subject area) were encouraged to engage with one another, rather than solely answering the questions of the researcher individually. Hence, the primary aim of the researcher was to shape and facilitate the discussion. It was borne in mind that successful focus group discussion depends on 'the development of a permissive, non-threatening environment within the group' (Hennink, 2007:6).

The pilot study tool comprised 15 probing questions, reduced to 13 questions in the final study. Three question probes were rephrased for the main study to avoid ambiguity and obtain clearer responses (see Appendix C1 for pilot study learner questionnaire questions and Appendix C3, Appendix C7 and Appendix C8 for the main study focus group discussion questions). The probes were related to the types of technology currently being used by teachers for TEL in the three subject areas.

Attention was paid to how often and for how long TEL was used. The type of career professional development (CPD) and training that teachers had received, together with their level of TEL competency, was also taken into consideration. Particular attention was given to how TEL was incorporated into lessons and how teachers perceived its impact on the teaching of EAL learners. These questions probes sought to establish whether teachers perceived the use of TEL to have a favourable impact on the teaching/learning experience of EAL learners and explored teachers' expectations. The pilot study built on the teacher questionnaire to gain a richer insight into teachers' perceptions and identify areas for further study. The inclusion of focus group discussions in the study also contributed to data and method triangulation.

Participants were welcomed and briefly informed about the process in a comfortable ICT room made available for the discussion. They were assured that their confidentiality would be protected and all opinions and perspectives were valuable- there were no 'right' or 'wrong' answers. Their permission was sought to use the equipment brought for audio recording the discussion. Two teachers raised objections about the focus group discussion being audio recorded therefore the discussion was not audio recorded. Audio recording equipment and such a request was not included in the main study focus group discussion. A few 'icebreaker' questions were asked to familiarise participants with the discussion process and reduce anxiety. This also helped develop a rapport. The session then shifted to an in-depth discussion, developed through the use of question probes, on participants' perspectives, attitudes and concerns. The researcher facilitated the discussion to ensure that all topics were covered. Participants were invited to express their comparative and contrasting views during the discussion. Facilitating a semi-structured discussion was deemed relevant in order to maintain a focus on the purpose of the research study. Responses were elicited from all participants in order to ensure equal participation. The focus group discussion lasted approximately 50 minutes, which was deemed an appropriate amount of time by the participants, given their busy schedules. Participants provided feedback that a more extensive and richer briefing about what to expect in terms of question probes, topics and research focus should be provided beforehand. This feedback was acted upon for the main study focus group discussion.

Focus group discussion during the pilot main study revealed that all three teachers engaged with TEL in the teaching of EAL learners. All three teachers had received

basic training in the use of TEL-related equipment .The types of technology employed included interactive whiteboards; the internet and web-based resources; computers and video clips. The three teachers from the pilot study indicated that TEL was used intermittently too mainly for the purpose of: researching new topics, redrafting work, teaching the content of the main lesson, and creating teaching/learning resources. They suggested that TEL could be consistently integrated during starter tasks, the main lesson and extension activities. They also expressed the view that the consistent, planned and structured adoption and integration of TEL into teaching/learning practice may help EAL learners engage with taught concepts, be focused and engaged during lessons and develop their independent learning skills.

It was noted at this stage, that teachers had different levels of minimal training in integrating and using TEL equipment for their teaching/learning practice. Teachers relied heavily on themselves to deliver subject-content through TEL. There was a lack of consistency and planned structure in integrating TEL to support EAL learners across the school in the three subject areas.

4.1.3 Pilot study lesson observation

Lesson observation as a data collection tool needed piloting, to ensure that it facilitated data collection clearly connected to the focus of this study. A pre-determined lesson observation schedule was designed (Appendix C4) and piloted in three lesson observations (one in each subject).

This comprised two main sections: one section on the teaching approaches incorporating the use of TEL; another on EAL learners' engagement in learning through TEL. The first section featured items for observation such as: learning outcomes linked to the curriculum and structure of the lesson and the incorporation of TEL use; teaching approaches employed; and resources used inclusive of TEL to support EAL learners. Consideration was also given to teachers' practical use and demonstration of TEL. The second section of the pre-defined lesson observation schedule focused on EAL learners' engagement. This sought to establish how purposefully EAL learners worked with TEL during lessons in both individual and group tasks; and whether they achieved the expected learning outcomes for the lesson.

The pilot study served as an initial trial for the main study lesson observations and was undertaken to gain a general insight into the existing daily use of TEL in classrooms.

The researcher had established a rapport with the participants who were familiar with the researcher's prior visits and practice of lesson observations in the school context. Using the lesson observation method provided the researcher with direct access to TEL practice under consideration. Instead of solely relying on asking participants what they do to use TEL with EAL learners and how this may impact EAL learners, the researcher was able to observe and record this first hand in a real context. The use of lesson observations contributed to data and method triangulation of findings (see Chapter Three). No changes were made to the observation schedule for the main study.

The pilot study revealed that teachers did not use TEL in a structured and consistent manner with EAL learners during their lessons. They recognised this through the shared lesson observation feedback and were willing and ready to participate in the main study and embrace the consistent and structured use of TEL in teaching EAL learners during phase 2 of the main study. In terms of the teaching approach, the lessons taught were led by anticipated learning outcomes connected to the curriculum. Lessons were suitably structured (introduction, development, conclusion, review). Two sets of lesson observations across phase 2 were integrated in order to explore findings that emerged from the consistent and structured integration of TEL for EAL learners during phase 2 of the main study.

4.2 Main study phase 1- Questionnaires

Data gathered from the completed questionnaires indicated that teachers had a positive perception regarding the incorporation of TEL in teaching/learning practice for EAL learners. From their perspective, the integration of TEL could generate positive outcomes in EAL learners' attainment and achievement when used appropriately with the relevant teaching/learning strategies. There was an indication from the teachers' and learners' responses that their perception and experience was that TEL was used across the school, although tools were varied and ranged from interactive whiteboards to online teaching resources. It was reported that pockets of more persistent TEL use were spread around the school in various subject areas, including in the English, mathematics and MFL departments.

4.2.1 Teacher questionnaires

Nine participants were invited to participate in the teacher questionnaire: two teachers from each of the three subjects (English, mathematics and MFL); and three heads of departments (HODs) (one from each of the three subjects). The main study teacher questionnaires consisted of ten questions divided into two sections (Appendix C6). The questionnaire was short due to teachers' workload and schedule and data was further explored through two focus group discussions in phase 2 of the study. The questions from the teacher participants' pilot questionnaire was used in the main study without modification. Six of the ten questions related to the use of TEL for teaching practice (questions 1, 2, 3, 6, 8 and 9). While all participants indicated that they used some form of TEL in their teaching practice and that this assisted them with providing EAL learners with instructions, six had experienced challenges when engaging with TEL; and six also indicated that they felt the integration of TEL in their classroom practice was more time consuming.

Types of TEL identified by all nine participants demonstrated different strategies for different purposes. All the teachers and HODs used TEL strategies for explaining subject content to EAL learners and involving them classroom tasks and extension activities to EAL learners. Classwork was mostly explained using overhead projectors and printed materials, while the internet was used to access different sources for class lectures and tasks. Only three teachers used a variety of types of TEL strategies and resources for explaining concepts related to their lessons.

Participants responded similarly to four questions about EAL learners' TEL based learning experience (questions 4, 5, 7 and 10). All participants perceived TEL to have a positive impact in the classroom and suggested that TEL could positively impact EAL learners in their engagement with formative and summative assessments. They all indicated that they would continue to use TEL in their work with EAL learners.

4.2.2 Learner questionnaires

In total, 50 EAL learners completed the main study learner questionnaires (Appendix C5). They confirmed that TEL was used in lessons (question 1); they liked TEL being used in their classrooms (question 5); TEL helped them understand subjects better (question 12); and it helped them progress and improve their learning (question 24). All 50 learners also shared that TEL made them more interested in learning (question

28), and was applicable to other subject areas (question 31). The first five questions asked learners to identify the lesson in which they used TEL and the types of TEL resources used. The responses were similar to those for the pilot questionnaire: 33 stated that TEL was used in mathematics lessons; 25 agreed it was used in English lessons; 9 mentioned that it was used in science lessons; 12 confirmed its use in MFL; and ten extended its application to other lessons. Learners were asked to select from a variety of TEL options regarding the types of TEL resources used in their lessons. The list that they selected included: whiteboards, overhead projectors, computers, the internet, web-based teaching, camcorders, scanners and printers.

Learners were asked to select how TEL may be used in lessons (question 4). Thirty learners responded that TEL was used to explain tasks and the information being taught by the teachers. All 50 learners noted that TEL was used to explain and clarify understanding of classwork and tasks. Twelve learners responded that TEL was used in lessons to enhance their learning, including topics beyond a course's curriculum; while 18 learners indicated that different types of TEL were used to perform tasks provided as homework by the teachers.

In addition to how learners used TEL, it was important to determine the length of time they engaged with it. Based on responses to question 29, 17 learners reported spending 30 minutes to 1 hour each day; 18 learners said they spent between 1.5 and 2 hours each day; and 15 learners spent 3 to 4 hours daily. This highlighted that all 50 learners were using TEL to facilitate their learning.

In relation to assessment, there were three main areas of focus: good grades (questions 6, 8, 10 and 26); examinations (questions 14 and 25); and homework (questions 13 and 19). There was some repetition in this questionnaire, acknowledged only later, but this was useful in determining whether learners were answering questions consistently. For example, question 8 asked participants: 'Has the use of TEL helped you get good grades in English?' and question 26 asked them 'Has the use of TEL strategies helped you to get good grades in English?'. The same applies to questions 14 and 25: 'Has the use of TEL helped you to gain good test results?' (Question 14); and 'Has the use of TEL strategies helped you to gain good test results?' (Question 25).

All participants responded 'yes' to all four of these questions. Upon reflection,

questions could have been reframed to ensure that learners were clear in their understanding about the difference between the use of TEL and that of TEL strategies – but as they indicated ‘yes’ to all of these questions, they clearly demonstrated consistency. In addition, question 13 asked participants whether use of TEL made their homework easier; all 50 responded, ‘yes’. Questions 6 and 10 asked learners whether use of TEL had helped improve their grades in mathematics and MFL respectively. 46 responded ‘yes’ for mathematics, while only 37 said ‘yes’ for MFL. The latter response was somewhat surprising, and is discussed in more detail later, with reference to recent research. Question 19 asked learners whether TEL assisted learners in completing their homework without help; 37 responded ‘yes’, and 13 ‘no’. Question 22 asked whether TEL had assisted in their understanding of French or Spanish (yes = 31); question 23 asked whether TEL had assisted in their mathematical skills ability (yes = 50). Three questions provided a list of options and asked EAL learners to ‘check all that apply’. These related to how TEL had helped EAL learners in English (question 9), mathematics (question 7) and MFL (question 11).

For the question related to TEL and mathematics (see Figure 4.1), the option, ‘do more mathematics homework’ was by far the most popular: with 45 participants selecting it. This seems to be consistent with responses to other questions, as EAL learners were generally positive about their ability to complete homework assignments with relative ease when using TEL.

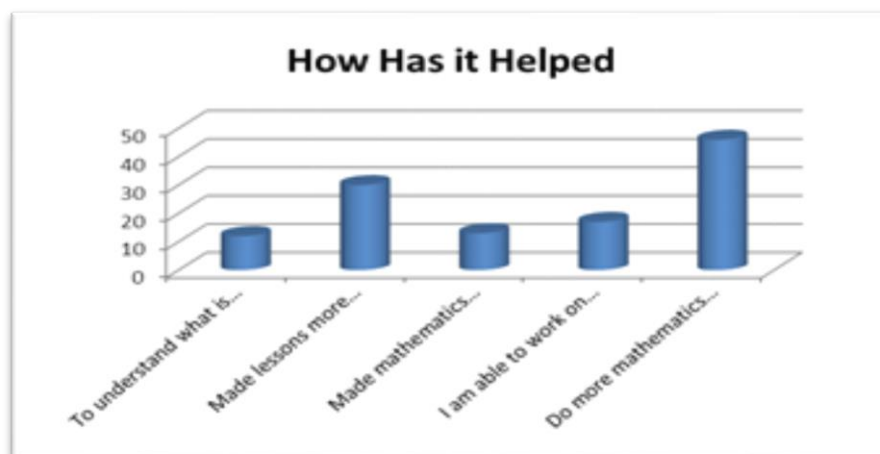


Figure 4.1: Learners’ perceptions on the usefulness of TEL in mathematics

Figure 4.2 below shows that unlike in mathematics, much more emphasis was placed

by EAL learners on understanding what was taught in English (yes = 40) and increasing interest in the lesson (yes = 38). This difference may be associated with the strategies employed in the classroom when using TEL.

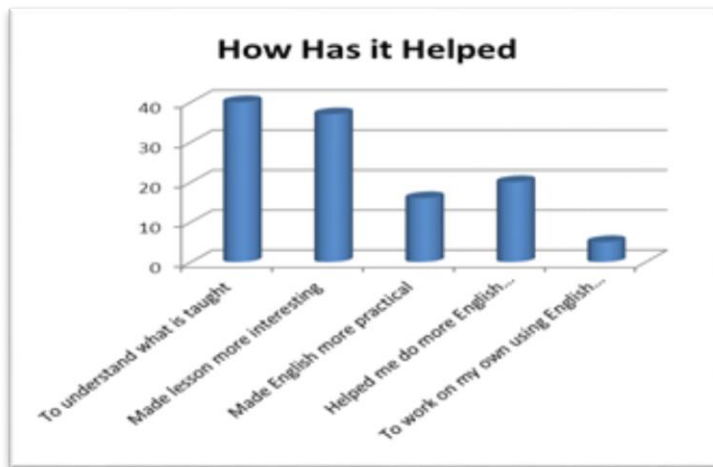


Figure 4.2: Learners' perceptions of usefulness of TEL in English

Fig 4.3 below presents the responses regarding the use of TEL in MFL lessons and is similar to those for English, with 29 learners noting that TEL helped them understand what was being taught, and 31 that TEL made the lessons more interesting.



Figure 4.3: Learners' perceptions of the usefulness of TEL in MFL

All 50 participants responded 'yes' to eight questions related to academic skills (questions 15, 16, 17, 18, 20, 21, 27 and 30) and to three of the questions related to studying (questions 16, 17 and 27). Question 16 asked participants whether TEL

resources helped them study better, question 17 whether they could study longer using TEL, and question 27 whether TEL increased their ability to study more.

Question 18 asked participants whether they had gained confidence in studying independently, and all responded positively; however, the responses to question 15, which asked whether they felt TEL helped them study more independently, yielded 43 'yes' and 7 'no' responses. While this still implies that the majority of EAL learners could work better independently, it suggests that some are still relying on other options in addition to TEL to supplement their learning (such as group work or teacher assistance). Data and method triangulation also enabled further exploration of why EAL learners gained confidence in studying independently (question 18) but did not put this into practice (question 15).

Participants were also asked about TEL strategies in relation to learning in specific subjects. Question 20 asked participants whether TEL had improved their reading skills, and participants were divided: 32 'yes', 18 'no'. There was a similar response when asked about TEL and language learning: 33 'yes', 17 'no'. Despite these differing positions, all 50 participants indicated they would be able to apply TEL to other subjects in various fields (question 30).

4.2.3 Discussion

The analysis of the questionnaire data from teacher and learner responses suggests that TEL has the potential to make a positive impact on the achievement and attainment of EAL learners. Similar to studies presented by Parr and Fung (2000), Andrews et al. (2002), Cox et al. (2003) and Hartley (2000), findings from the questionnaires contribute to the perception that TEL has the potential to make a positive impact on learning in general and the learning experience of EAL learners in particular. The views expressed are consistent with similar aspects that emerged in the literature, where studies of EAL learners indicate that TEL improves both self-regulation and self-determination (Corden, 2001; Matsumara et al., 2008). This general ability to support thinking and assist EAL learners in their learning process may also improve their participation in class discussions (Dyson, 2004; Matsumara et al., 2008; Nystrand, 1996).

4.3 Main study phase 2- Focus group discussions

When undertaking educational research, the aim of focus group discussions is to understand participants' meanings and interpretations (Morgan, 2002). In phase 2 of the main study, a semi-structured focus group discussion approach was employed, facilitating discussion based on participants' social construction of knowledge and practices. Such engagement contributed to a deeper explanation of attitudes, behaviour, opinions and perceptions of teacher participants (Hennink, 2007) on the effectiveness of TEL teaching for EAL learners, and its impact on their educational attainment (see Chapter Three for a more in-depth outline of the focus group discussion method applied in this study). The main aim of the focus group discussions was to obtain deeper understanding of teachers' experience of consistent and structured TEL use with EAL learners in lessons; consider the types of TEL equipment that teachers used; and learn how they were incorporated into teaching/learning sessions for EAL learners. In particular, the aim was to discover how TEL influenced the teaching/learning of English, mathematics and MFL. For the main study, two focus group discussions with nine participants: three HODs (one from each subject area) and six teachers (two from each of the three subjects) was developed.

4.3.1 Focus group discussion 1

Teachers were provided with a pre-focus schedule that summarised the issues, which were going to be discussed, so they could think about them and reflect on their perspective before the discussion. This was informed by feedback collated from the pilot study focus group discussion. This information was made accessible in order to facilitate participants' active engagement in an organised and semi-structured discussion. Adequate briefing information enabled participants to be better prepared and avoid evasion in their responses. Participants' contributions were recorded through anonymised written notes. This was done to avoid 'good participant' or 'apprehensive participant' roles (McLafferty, 2004). Recorded, handwritten notes were later checked with participants, to verify that these were a true representation of the discussion.

On the day of the focus group discussion, the venue was set up with the required materials, and refreshments were made available. The researcher arrived before the participants and ensured that the room was comfortably set up for the participants to

feel at ease. During the discussion, the researcher ensured that every participant was heard, quieter members were drawn into ongoing discussions connected to the research focus, and time was carefully monitored. During the discussion, it was vital for the researcher to ensure that it remained on track whilst facilitating an exchange of opinions.

From focus group discussion 1, it emerged that a range of TEL equipment and software was being used to teach EAL learners. The main technologies for TEL's use in delivering lessons to EAL learners included interactive whiteboards, the internet, online teaching resources, film and video clips, Microsoft Office, CDs, DVDs, and cassettes. Other equipment and resources included iPads, computers, web-based resources, projectors, and Adobe Acrobat Pro. In verifying the areas in which TEL was used, the discussion indicated that internet research was used for teaching new topics, re-drafting written work, and KS5 research. TEL was also used in: teaching the main lesson; practicing grammar; getting EAL learners involved in a topic, and creating teaching/learning resources. Participants revealed that the incorporation of TEL into EAL learners' lessons was more frequent during KS4 and KS5 lessons than KS3, because learners were being prepared for GCSE exams. In addition, a majority of participants indicated that TEL was used for approximately one to five lessons a week, rather than for all six lessons taught every day by each participant.

Participants shared that they had had received basic initial training in the use of ICT and different technology and specific software. However, they needed to rely on other teacher training and curriculum websites, their own initiative and devices to deliver the curriculum and engage in teaching/learning practice through TEL. The researcher probed further into the issue of training to gain more detailed understanding about the type and level of support they had received in the school. Their responses ranged from assistance from ICT technicians in sorting out hardware and software-related issues; periodic in-service training days in the use of application software; and departmental support in locating web-based teaching/learning resources. The indication was therefore that teachers were supported enough to facilitate 'smooth functionality' when using TEL in lessons. Though all participants had some degree of competence in the use of TEL, their perspective on TEL based strategies and pedagogy covered a spectrum from limited to significant experience. On being asked about this, participants shared that CPD training had been accessed in different ways with some participants

commenting that they had not had any opportunities for CPD training. This thereby indicating that the training received was not uniform. Nevertheless, it was apparent that most training had been satisfactory, and that TEL had been adopted by all the teachers. TEL was used to support EAL learning; teachers believed that its use in teaching/learning could make a positive impact and difference in the education of EAL learners.

The focus group discussion proceeded to examine the specific use of TEL and how teachers intended to incorporate it into their lessons for the duration of the study. The teachers indicated that TEL was incorporated in starter tasks which engage EAL learners at the beginning of lessons, and during the teaching of the main lesson.

Overall, teachers' expectations were that the use of TEL in lessons would improve EAL learners' grades, proficiency, mastery of concepts and skills in a specific subject area. Teachers believed that TEL could make EAL learners more independent and confident, develop their research skills, and to some extent improve their language skills. Overall, teachers participating in the focus group discussion regarded the use of TEL in lessons as positive.

In verifying the areas in which TEL was used, the responses indicated that internet research was used for teaching new topics, re-drafting written work, and KS5 research. TEL was also used in teaching the main lesson, to practice grammatical points and structures, get EAL learners involved in a topic, and create teaching/learning resources. Participants revealed that the incorporation of TEL into EAL learners' lessons was more frequent during KS4 and KS5 lessons than KS3. In addition, a majority of teachers indicated that TEL was used for approximately one to five lessons a week, rather than for all six lessons taught every day by each teacher.

Teachers were questioned regarding the type of formal training they had received on providing lessons with TEL - and indicated they had received initial training in the use of ICT, different technology and specific software. However, they needed to rely on other teacher training and curriculum websites, their own initiative and devices to deliver the curriculum through TEL. The researcher probed further into the issue of training and asked the teachers about the type and level of support they had received in school. The responses ranged from assistance from ICT technicians in sorting out hardware and software-related issues; periodic in-service training days in the use of

application software; and departmental support in locating web-based teaching/learning resources. The indication was therefore that teachers were supported to a considerable extent when using TEL in lesson-delivery.

It was interesting to note from the focus group discussions that all teachers involved in teaching EAL learners had some degree of competence in use of TEL, although their ability covered a spectrum from limited to significant experience. Therefore, further questions were asked concerning teachers' level of training and competence in use of TEL, and whether their CPD training had covered it. Responses were varied: with some participants saying that they had not undertaken additional CPD, thereby indicating that the training experienced was not uniform. Nevertheless, it was apparent that TEL had been adopted by all the participants to support EAL learning and they believed that its use in teaching/learning could make a positive impact and difference in the education experience of EAL learners. For instance one participant commented that "The thought of teaching EAL learners scares me! I simply do not know what to do. As a Newly Qualified Teacher, I struggle to teach my classes. I grapple with classroom control and then aspects of the curriculum: to have EAL learners in my classes adds to my woes. I have not been trained to use TEL with EAL learners. I just teach them like the rest of the class. Hopefully their inability to achieve will be put down to language." However, another participant explained that, "We may not have had specific TEL training to work with EAL learners; myself included but we do have a selection of teachers who are interested in TEL for EAL learners: I am one. My classes comprise predominantly EAL learners. I have found using TEL extremely helpful. TEL has afforded me the knowledge to develop ways for scaffolding language for EAL learners. General TEL training has taught me to ensure that my lessons are visual and that provides opportunities for EAL learners to practise their English." In addition, the focus group discussion proceeded to examine the specific use of TEL and how some participants intended to incorporate it into their lessons for the duration of phase 2 of the main study. For example, some teachers indicated that TEL was incorporated in starter tasks which engaged EAL learners at the beginning of lessons, and during the teaching of the main lesson.

Overall, teachers' expectations were that the use of TEL in lessons could improve EAL learners' grades, proficiency, mastery of concepts and skills in a specific subject area. Teachers believed that TEL could make EAL learners more independent and

confident, develop their research skills, and to some extent improve their language skills. Overall, teachers participating in the focus group discussion regarded the use of TEL in lessons as positive.

4.3.2 Focus group discussion 2

Focus group discussion 2 further explored teachers' expectations that had emerged during focus group 1 discussion. Teachers were positive about the use of TEL in lesson delivery and EAL learning. The teachers thought that the initiative during phase 2 of the main study had been highly effective; although there had been challenges, in addressing a wide range of abilities. Teachers indicated that they were planning more purposeful EAL learner-specific lessons and EAL learners engaged more actively. This is summed up in the statement made by a teacher in the focus group discussion: "I call my teaching room 'The Globe'. The range of nationalities in my room is incredible. The differing uses of language and cultural perspectives are enormous. The differences provide a dynamic classroom environment. This cultural diversity makes it imperative not to make assumptions about EAL learners' culture, values and learning. The cultural diversity creates a safe and conducive environment for learning, especially for EAL learners, while affording me the opportunity to improve my use of TEL and plan its integration in my classroom practice." Some teachers also shared that they were better able to plan 'purposeful lessons' with the learning needs of specific EAL learners in mind - and could more confidently differentiate teaching/learning resources to match the different ability levels of EAL learners. However, one teacher showed that the task of working with diverse EAL learners could be overwhelming by stating, "Teaching EAL learners has always been a challenge for me. It is challenging to teach EAL learners sometimes even with support in the classroom. I try not let it affect my lesson delivery. I try not treat EAL learners differently from my other learners." One teacher wondered if the struggle of working with EAL learners was caused by their 'lazy' attitude by claiming, "Sometimes I find that EAL learners in my class can simply be lazy. They do not make much effort to engage with learning and understanding English."

Focus group discussion 2 revealed quite clearly that there was further need for more classroom support assistants for EAL learners. TEL strategies could also be extremely challenging in terms of developing EAL learner-specific tasks and differentiating work for mixed ability EAL learner groups; they pointed out, however, that these challenges were easier to meet homework, extension tasks and delivering lessons for the whole

class. For instance one participant explained that, “Teaching EAL learners is lots of work! The first term is always difficult as most of my EAL learners are often unable to communicate verbally especially if no other learner speaks their native language. I use a lot of TEL resources for storytelling and so on, and try to keep language very simple. When they do pick up the language, enough English to communicate with me and their peers, lessons then pick up. I can do more with them then.” Another participant claimed that: “The majority of the EAL learners I teach have English as an additional language. I am fortunate they can communicate and complete work set through TEL without support. I happen to teach a ‘top set’ English group. In my initial years of teaching, a lot of the customs and cultures of the different EAL learners were all new to me. Now I have come to embrace them and educate myself about the EAL learners’ lives outside of school. Knowledge about EAL learners greatly helps with my teaching with TEL for EAL learners.”

On the whole, the focus group discussions verified that specific gains were perceived from the use of TEL with EAL learners. The perceived the structured and consistent use of TEL with EAL learners could contribute to their learning progress, achievement and attainment in English, mathematics and MFL.

4.3.3 Discussion

The focus group discussions provided data which led to significant insights into the impact of TEL on EAL learners. The focus group discussion allowed participants to share and build on their views and experience through interaction in the group. This also afforded the researcher the chance to document the diverse and similar experiences of several participants.

Conducting the focus group discussions through a semi-structured approach gave the researcher the opportunity to interact with participants, pose follow-up questions, and ask questions that scrutinised issues raised more deeply. The technique also proved time-effective in comparison to the time required for interviewing participants individually.

Nonetheless, while the use of the focus group discussion enabled the research to further explore provided information in teacher questionnaires, the data was still limited and needed to be combined with other research methods. In general, the data from the focus group discussions highlighted the findings that the consistent and structured

use of TEL is perceived as having a positive impact on the learning experience of EAL learners. Teachers' positive attitudes towards the use of TEL with EAL learners during their lessons correlated with the data collected and analysed from the teacher questionnaires. For instance, participants shared that the consistent and structured integration of TEL in teaching/learning could help EAL learners engage with the concepts being taught, enable them to become more focused during lessons, and could, potentially, facilitate their development as independent learners.

4.4 Main study phase 2 – Lesson observations

The lesson observation data collection tool was used to explore teachers' attitudes towards and practice of TEL in lessons. The findings suggest that the benefits of employing TEL to teach EAL learners motivated teachers to use TEL; and outweighed the challenges posed by this. Lessons employing TEL were led by anticipated learning outcomes connected to the curriculum, which were clearly and explicitly defined. TEL was incorporated and used as a supplementary tool with a range of teaching approaches in lessons. EAL learners engaged in lessons and used the TEL resources provided, progressing at their own pace in the extended tasks set. The lesson observation data gathering tool created the opportunity to record significant events related to the research focus of this study, especially the interaction between EAL learners and teachers and their engagement with TEL during lessons.

In the two sets of lesson observations for each of the three subjects, structured, consistent application of TEL was incorporated and used as a supplementary tool with a range of teaching approaches in lessons. It was observed that the behaviour of teachers and learners were positive; the use and level of engagement of TEL displayed considerable improvement in comparison to the pilot study lesson observations. The first set of lesson observations demonstrated that teachers used diverse TEL strategies in instruction to deliver the content of what was being taught. Particular attention was given to consolidating learning and providing constructive feedback to EAL learners on their learning through TEL. The second set of lesson observations was undertaken to confirm the findings of lesson observations 1. The findings of lesson observation 2 suggest that the benefits of employing TEL in a structured, consistent manner to teach EAL learners motivated teachers to use TEL. The benefits outweighed the challenges. EAL learners engaged in lessons and used the TEL resources

provided, progressing at their own pace in the extended tasks set. The results indicated that content and organisation of lessons fulfilled expected TEL learning outcomes. A variety of TEL teaching learning strategies were being used by teachers, especially in instruction, in a consistent, structured way. To a certain degree teaching practices adopted did take into consideration the use of appropriate TEL and the needs and abilities of learners.

Nevertheless, lesson observations did reveal that TEL use was not always planned to be responsive to and match specific needs and abilities of diverse EAL learners in the classroom. Data and method triangulation with evaluative test results also showed that the different stages of English language development (Cummins, 2000) did impact on evaluative test scores (Figure 4.4). Furthermore, peer discussions and group activities did not always use any form of TEL to improve engagement in the learning process during lesson observations.

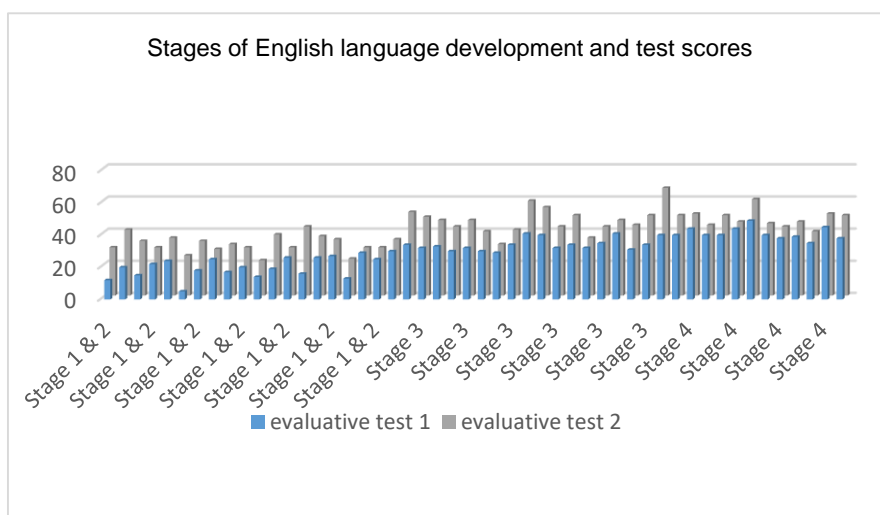


Figure 4.4. Stages of English language development and evaluative test results

4.4.1 English lesson observation 1 and 2

Approaches to TEL use in the classroom were observed during two separate English lesson observations for the same class. The researcher noted the teaching/learning approaches and the TEL strategies used in each lesson. These were later compared to the expected lesson outcomes linked to the curriculum, to ascertain whether these were met. Both lessons were guided by the expected learning outcomes. Both observations revealed the incorporation of questioning and the use of TEL. During both observations of English lessons, the teacher used TEL to explain tasks, organise

classwork, and in extension activities for taught components. Observations indicated that proper attention was given to consolidating learning and providing constructive feedback to EAL learners on their learning and use of TEL. EAL learners engaged in answering questions when provided with TEL methods to complete structured online classwork.

The data gathered through the two lesson observations are presented in Figure 4.5 which compares the two lessons in terms of use of TEL, effort of teachers, and overall EAL learner engagement in the classroom environment. It shows that the number of positive statements about performance during the first lesson observed was six, rising to ten in the second lesson; while the use of TEL was nine during the first lesson, and 10 during the second. Effort declined during the second lesson observed: from 15 to seven. The behaviour of the teachers and learners also exhibited improvement: from three during the first lesson observed, to six during the second.

The use of TEL methods in the classroom displayed considerable improvement, as corrective statements (when study participants had to be corrected or assisted in the application of TEL) declined to three during the second lesson observed, compared with five during the first lesson. Corrective statements about effort on the part of learners further declined: from five during the first lesson, to four in the second. However, corrective statements about learner behaviours were consistent; no change was observed.

There was variation in the number of times and reasons why learners called for help. These calls could be attributed to any failure in learner ability to perform according to expectations, or effort expended on class assignments. The distribution of calls in terms of performance, effort and behaviour indicate an overall improvement in the learning scenario. The number of calls for assistance decreased from four to three (performance), three to one (effort) and five to two (behaviour).

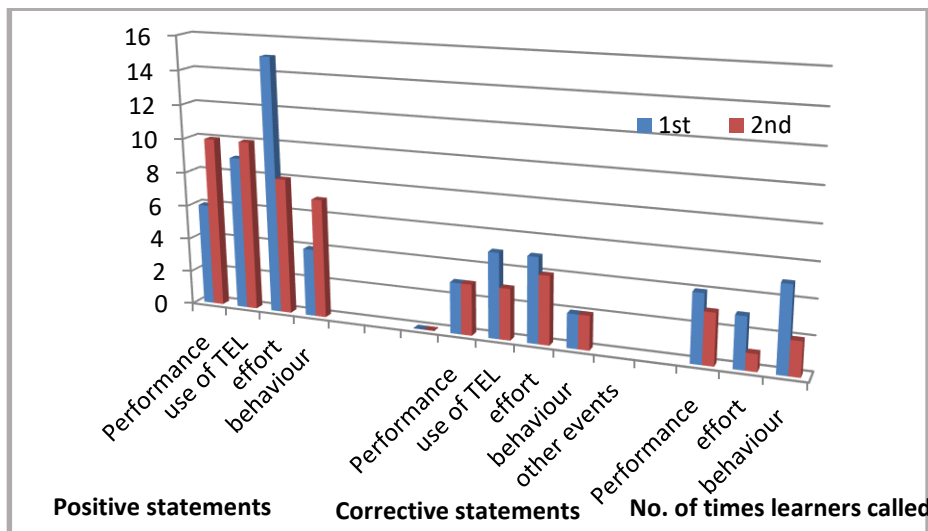


Figure 4.5: Learner statements about TEL in English lesson observations

Observations were made of the presence of different variables and use of different approaches in teaching practices and in the classroom environment. Most of the results observed for English lesson 2 were similar to those for English lesson 1, except that data from positive corrective statements were also recorded. Observations tested the teaching approaches used in the classroom environment, and ascertained whether the lesson was guided by the expected learning outcomes, linked to the curriculum and TEL. The observations revealed that the lesson was guided by the expected learning outcomes during both lessons; and that TEL methods were included. Organisation of lessons was according to structured requirements, and included an introduction, development, and conclusion. The use of TEL practices in lessons was observed and demonstrated positive outcomes.

The teacher of English lesson observation 2 used TEL to clarify assignments, organise classwork and broaden exercises on what had been taught. The methods used by this teacher depended on the needs and capabilities of the learners and their capacity to use TEL. The methodologies demonstrated that the material and practices were appropriate for the needs and levels of the learners; while the utilisation of TEL systems was adequate, with viable use of online assignments and other such exercises to improve TEL abilities in learners. Legitimate consideration was given to the consolidation of learning, and valuable feedback provided to learners in their learning and use of TEL.

How learners engage in learning was of special interest to this study. Data were collected on different features observed in-class, revealing that learners were provided with TEL resources to use in their lessons. The data indicated that learners were engaged in answering questions and engaging online with TEL. Observational data confirmed that inter-learner discussions and group activities were conducted without using during either of the lessons observed. Data gathered via the observations opportunities for TEL extension tasks was integrated and accessed by some EAL learners.

Data performance, TEL use, teacher effort and overall behaviour in the classroom environment were further analysed, enabling a comparison between the two lessons. During the first lesson, 11 positive statements about performance were made compared to seven during the second; while statements about effort improved from six to eight. The behaviour of teachers and learners in the classroom also improved: from three during the first lesson, to seven during the second.

Corrective statements about performance increased from three to four; while the use of TEL methods in classrooms displayed an identical trend, with corrective statements also increasing from three to four. Corrective statements about effort also rose, from four to six. Corrective statements about behaviour, which increased from two during the first lesson to three during the second, emphasised the variation in the number of times and reasons why learners called for assistance. These calls could be attributed to various factors, such as lack of learner ability to perform according to expectations or in class assignments. The distribution of calls in terms of performance (3:1), effort (5:3) and behaviour (3:2) also demonstrated overall improvement.

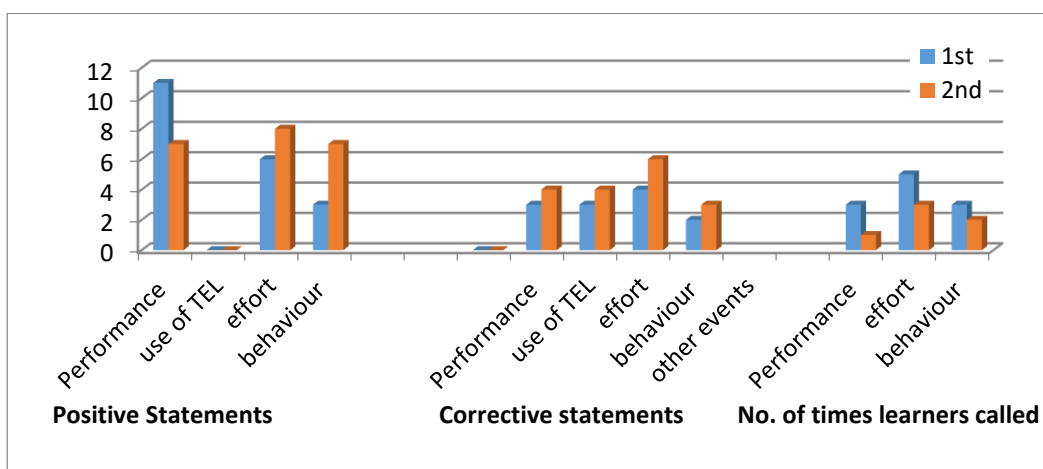


Figure 4.6: Learner statements about TEL in English lesson observations

4.4.2 Mathematics lesson observation 1 and 2

Observations of mathematics lesson observation 1 and 2 were conducted in the same way as those of English lessons: namely, by observing two lessons (July and August 2014). The use of diverse methodologies in teaching practices was observed. Details about whether the lesson was guided by expected learning results connected to the educational module and TEL were recorded during both lessons. Teaching practice incorporated diverse, helpful and critical ways to enhance learning through TEL. Without TEL collaborative and co-operative learning was utilised in practice during both observed lessons.

In-class observations yielded data about how learners engage in the learning stream. Data gathered through observations found that TEL resources were available for learners to use in their lessons to engage in structured online work and answer questions. TEL was also used for inter-learner discussions and group activities via which positively impacted learner engagement in the learning process. The data also clearly indicated progress in learning through accessed opportunities for TEL extension tasks over the two lessons.

Data were further analysed, in order to compare the two lessons observed Figure 4.7. This revealed eight positive statements about performance during both lessons; while the number of positive statements about the efforts of learners increased from seven during the first lesson to 12 during the second, indicating a marked improvement in the overall use of TEL methods in the classroom. The behaviour of both teachers and learners in the classroom also showed signs of improvement, with an increase from four during the first lesson to eight during the second.

Corrective statements about the use of TEL methods improved: registering a decline from three to one. Corrective statements about effort also fell, from three during the first lesson to zero during the second. Moreover, corrective statements about behaviour dropped from four to one. Furthermore, corrective statements about practices to involve learners in learning and the use of TEL fell from two to none.

Variation in the number of times and reasons why learners asked for assistance was

also noted. The distribution of calls for assistance in terms of performance (2:1), effort (no change at two) and behaviour (no change at three) also displayed overall improvement. These calls could be attributed to lack of ability to perform according to expectations, or efforts expended in performing a class assignment. A decline in the number of calls for support can be identified as an increasingly significant factor.

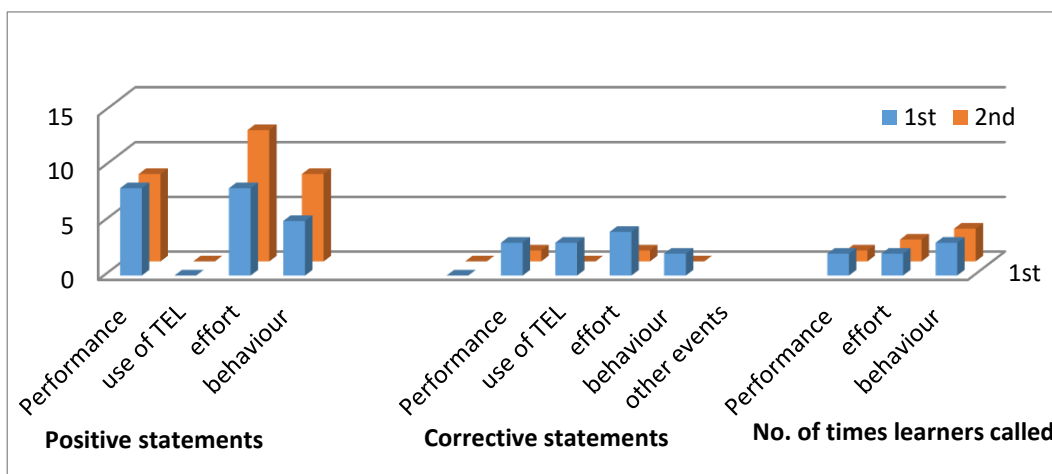


Figure 4.7: Learner statements about TEL in mathematics lesson observations

In both lessons, the teacher used TEL to clarify important aspects of the lesson content, key concepts and expand practice on what had been taught. Investigations were made into whether the teaching material included online practice and distinct activities. It was found that online maths assignments and other activities fostered TEL capacity in EAL learners. Careful thought was given to consolidating learning. Learners were provided with useful formative feedback on their learning and use of TEL; and their learning was further engaged with in response to such feedback.

4.4.3 MFL lesson observations 1 and 2

Observations of two MFL lessons, similar to English and mathematics lesson observations, were conducted by visiting the classroom and observing the practices of teachers and experiences of learners (July and August 2014). The lessons spanned 50 minutes. During observations, factors such as different teaching approaches and learner engagement through use of different TEL methods and other relevant sources were carefully observed. Teaching strategies used in the classrooms were examined to ascertain whether there was demonstration of structured and consistent use of TEL.

Observations from the two lessons showed that teaching methods incorporated diverse, helpful, critical ways of enhancing learning. Both lessons indicated the use of questioning, use of TEL, guided activity and discovery, talk and discussions, and online-based learning. Other critical thinking methodologies, such as collaborative and co-operative learning, were not employed in either lesson.

During both lessons, the teacher used TEL to clarify tasks, organise classwork and develop exercises on what had been taught. The observations also recorded whether the teaching material incorporated online assignments and different exercises in course material and classwork. Methods used by the teacher were, overall, appropriate for the needs and capabilities of the learners in the MFL class; and their capacity to use TEL. The teacher emphasised online assignments and tasks as a useful TEL based resources, but other techniques and approaches were ignored. The information recorded over the two lessons demonstrated that appropriate consideration had been given to combining learners' learning with helpful formative feedback on their learning and use of TEL. The data gathered via in-class observations over the two lessons displayed similar results; no major change in the teacher's approach to engage learners was identified. Learners were provided with TEL resources for use during both lessons. The data clearly indicated that learners engaged in question-answer practice and were provided with TEL avenues through which to engage in online-structured work during both lessons. Inter-learner discussions and group activities did not use any form of TEL to improve learner engagement in the learning process during either lesson.

Learners had enough opportunities to participate in the lesson, and the adopted teaching approach incorporated interesting ways of engaging learners in learning: sometimes by challenging them with tasks that increased their interest. Overall, both MFL lesson incorporated sufficient demonstration of structured and planned TEL use mapped to the lesson outcomes.

Data gathered were further analysed in order to make comparisons between the two lessons observed (Figure 4.8). There were three positive statements about performance during the first lesson, and a large improvement to eight during the second. The number of positive statements about effort also increased, from six during the first lesson to 10 during the second; while behaviour deteriorated slightly, from nine positive statements during the first lesson to eight during the second. Overall, the TEL methods and expected outcomes of the two MFL lessons were positively associated.

Corrective statements about the use of TEL methods in MFL lessons displayed an improvement from five to eight; while those about effort remained consistent and those on behaviour improved, falling from six to five. Corrective statements about other events in the classroom also decreased, from seven to six. Variation in the number of times and reasons learners called for support was noted; the distribution of calls in terms of performance (1:2), effort (3:2) and behaviour (4:3) revealed an overall improvement.

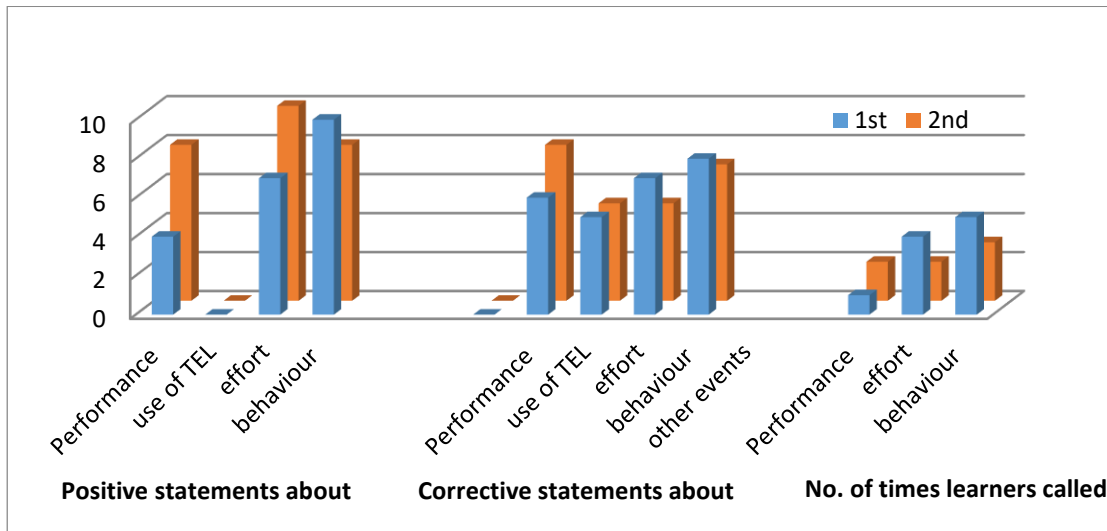


Figure 4.8: Learner statements about TEL in MFL lesson observations

4.4.4 Discussion

Both the content and organisation of lessons were evaluated to verify whether they fulfilled the expected TEL learning outcomes, which they did. The use of questions, discussions and structured and planned integration of TEL, such as online-based learning activities, was common in both lessons observed. The teacher used TEL to explain tasks, organise class work and expand concepts: offering learners more opportunities to practise what had been taught.

The observations also provided data about whether teaching practice took appropriate consideration of TEL and the needs and abilities of EAL learners. This was indeed achieved to a certain degree for EAL learners as a whole group. The teacher's demonstration of TEL was clear during both lessons, and included conceptualisation of differentiation in terms of how some low-ability EAL learners could engage with TEL to enhance their learning. For instance, the observations recorded how practical usage

of online assignments and other such activities could enhance opportunities to improve learners' learning experience and TEL capacities. The findings suggest that the benefits of employing TEL in a structured, consistent manner motivated teachers. Compared to the pilot study, there was an improvement in the integration of a variety of TEL resources. EAL learners were engaged throughout the lessons, used TEL resources provided and made progress at their own pace. The content and organisation of lessons, integrating TEL, matched expected learning outcomes.

4.5 Evaluative tests 1 and 2

To determine how the consistent use of structured and consistent use of TEL affected EAL learners in the classroom, all participants were required to complete evaluative test 1 (phase 1 of the main study) and evaluative test 2 (phase 3 of the main study after the consistent and structured integration of TEL during phase 2 of the study): based on a standardised system in each of the three subjects. These standardised tests were selected from the GCSE examination bank and chosen because they were validated and readily available. Examinations included those set by Assessment and Qualifications Alliance (English), Edexcel (Mathematics), and Oxford and Cambridge RSA Examinations (MFL).

The evaluative test 1 results of EAL learners, based on test results in English, mathematics and MFL, were significantly lower than those of their peers who were proficient in English as a first language. The most striking difference was in English, where EAL learners scored significantly lower compared to first language English-speaking counterparts. However, the evaluative test 2 scores revealed a significant improvement in the test scores of EAL learners exposed to the structured, consistent use of TEL in teaching and learning. Overall, the gap between the two groups narrowed, with some EAL learners even performing better in some subjects (though this did not occur in English).

The approach used was to create a set of evaluative tests 1 and 2 measures, then use a paired-comparisons t-Test to analyse for change. To do this, items were converted into an identical set of scales for both time periods. The marks for a group of students for evaluative test 1 and evaluative test 2 were recorded. Data was entered in SPSS in two columns, where one column indicated the evaluative test 1 result; the other, the evaluative test 2 result. A third column was included for participant numbers. The two-

paired variables were selected. The evaluative test 2 variable was selected first followed by the evaluative test 1 variable. The output was an overview of the processed data, relevant results for the paired test and the statistics. To calculate the differences between the evaluative test 1 and evaluative test 2, SPSS was used; and subsequently, charts (histograms) produced to show the differences.

4.5.1 Findings

The figures below present the test scores for the EAL learners before and after the structured, consistent use of TEL in instruction was implemented, compared to their first language English-speaking counterparts.

In evaluative test 1 in all three subjects (taken before the structured, consistent use of TEL in teaching and learning), those who spoke English as a first language outperformed their EAL peers. Their test results in English, mathematics and MFL were significantly higher than those of the EAL learners. In English, the gap between EAL learners and their counterparts was substantial.

After the structured, consistent use of TEL in the teaching and learning of EAL learners, evaluative test 2 results indicated a significant narrowing of the gap in results between the two groups. EAL learners, as shown in the figures below, performed better: with some even scoring higher than their English as a first language speaking peers. This was however, not observed for test results in English. While there was a significant rise in EAL learners' test scores in all three subjects, EAL learners could not make progress comparable to that of their English as a first language peers, who continued to make progress. A direct comparison of EAL learners' evaluative test 1 and test 2 scores is shown in the data presentation below. All participants demonstrated an improvement in their mathematics test results after the consistent use of structured TEL; similarly, the majority of participants obtained higher scores after the consistent use of structured TEL for instruction in English, compared with before phase 2 of the main study. Finally, all participants showed at least some improvement in their MFL evaluative test 2 results (Figure 4.10).

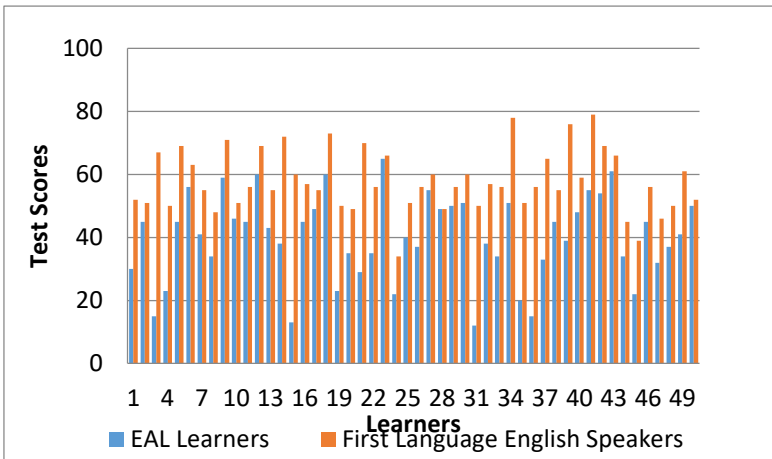


Figure 4.9: Evaluative test 1: MFL test scores for EAL learners and first language English speakers.

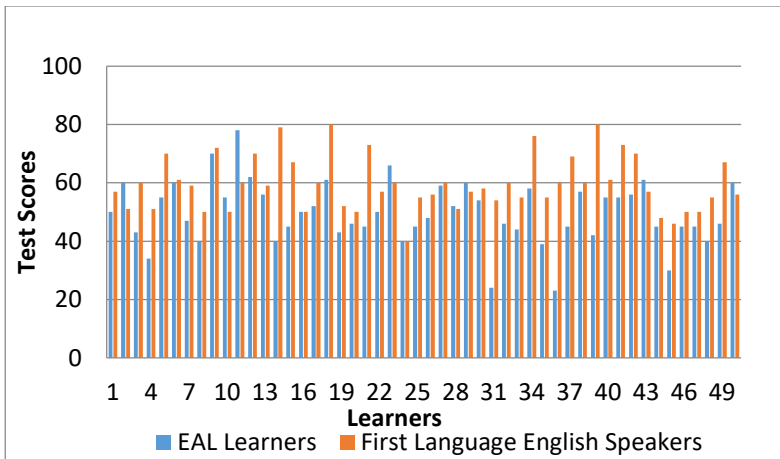


Figure 4.10: Evaluative test 2: MFL test scores for EAL learners and first language English speakers.

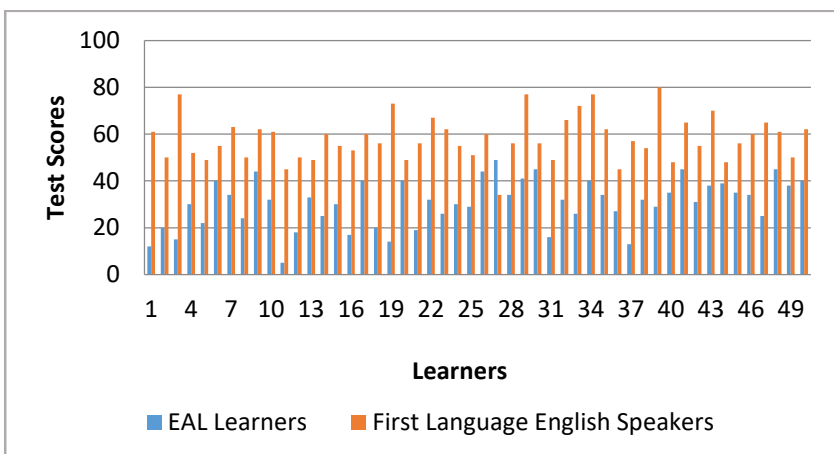


Figure 4.11: Evaluative test 1: English test scores for EAL learners and first language English speakers.

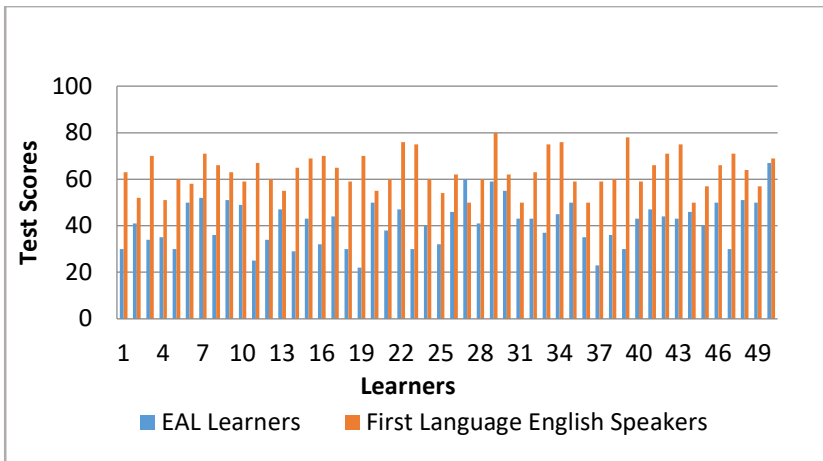


Figure 4.12: Evaluative test 2: English test scores for EAL learners and first language English speakers.

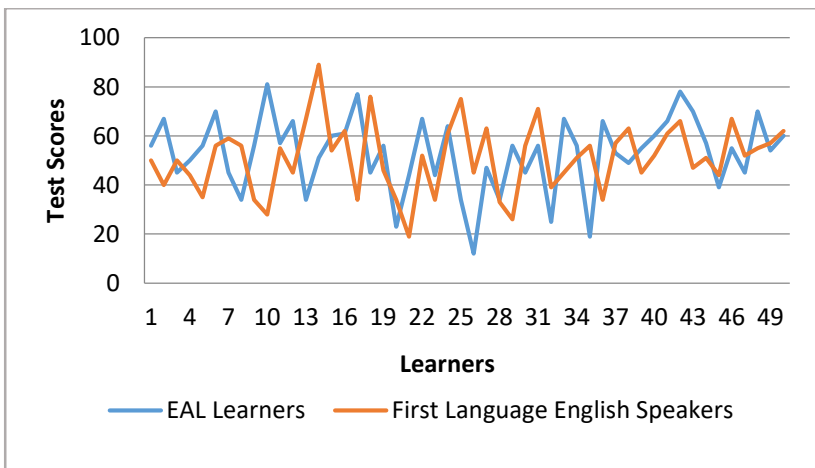


Figure 4.13: Evaluative test 1: Mathematics test scores for EAL learners and first language English speakers.

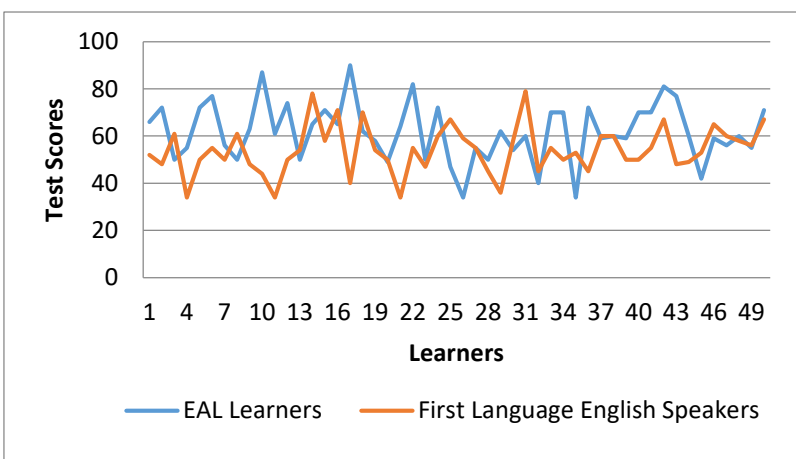


Figure 4.14: Evaluative test 2: Mathematics test scores for EAL learners and first language English speakers.

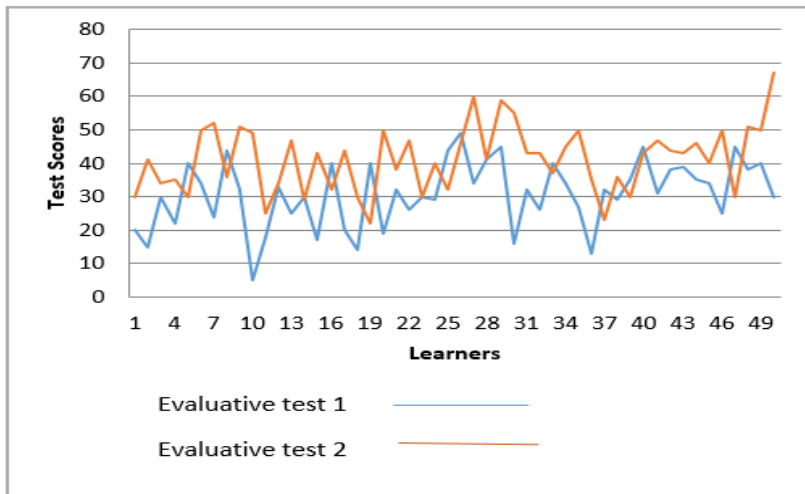


Figure 4.15: EAL learners' evaluative test 1 and evaluative test 2 mathematics results

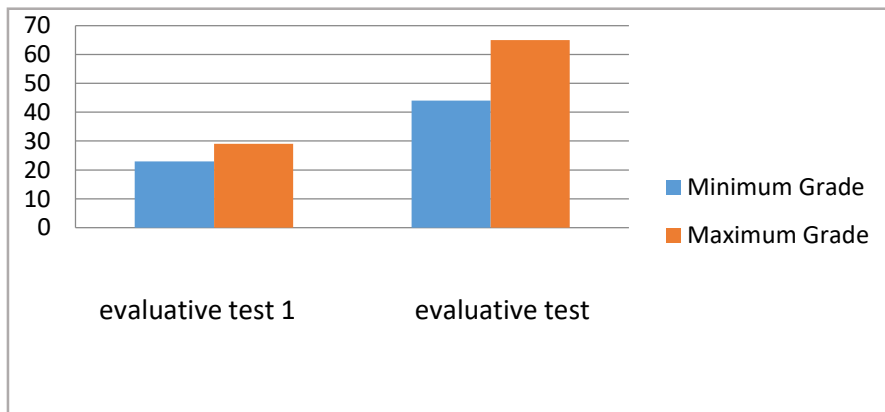


Figure 4.46: EAL learners' mathematics evaluative test 1 and evaluative test 2

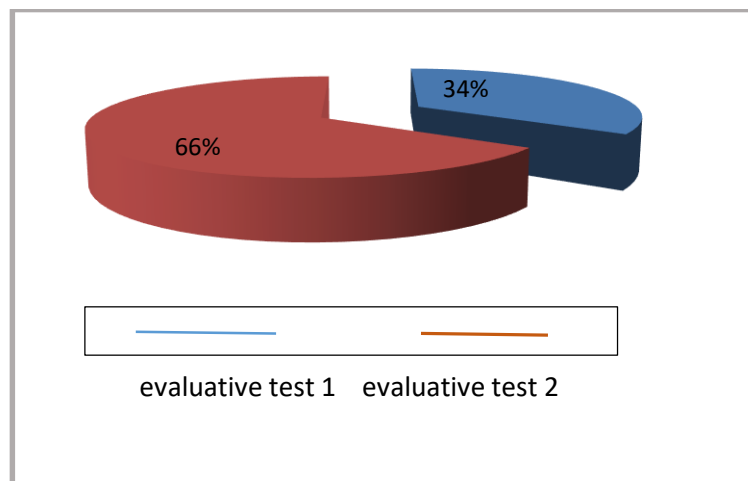


Figure 4.17: EAL learners' evaluative test 1 and evaluative test 2 English results

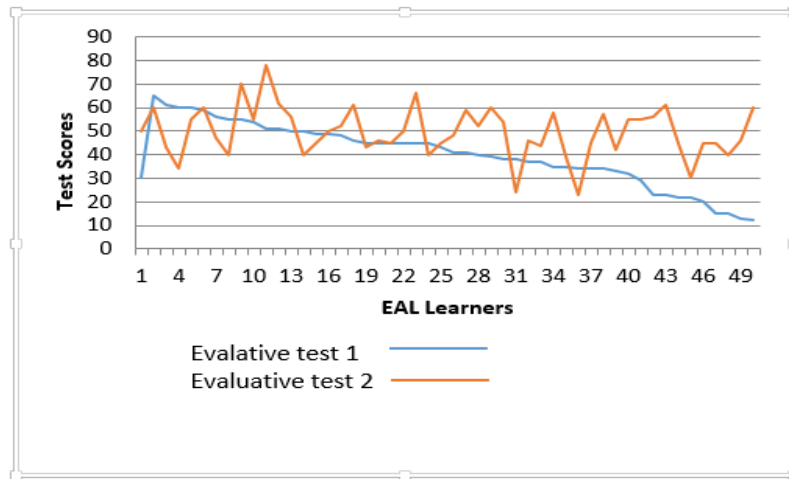


Figure 4.18: EAL learners' English evaluative test 1 and evaluative test 2

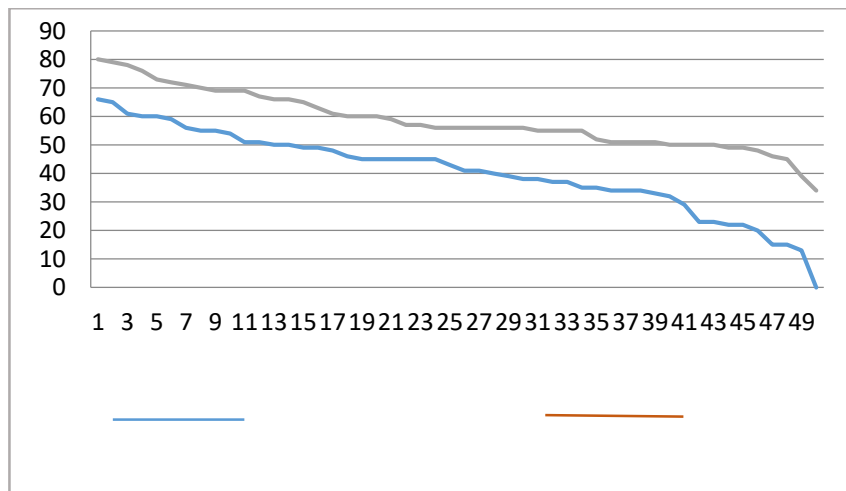


Figure 4.19: EAL Learners' and First Language English Speakers evaluative test 1 and evaluative test 2 MFL results.

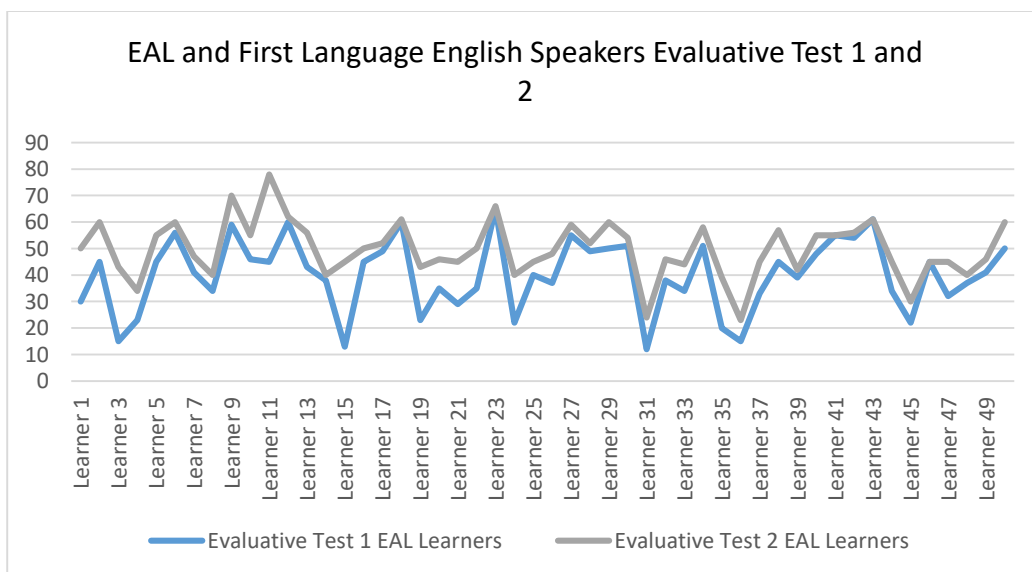
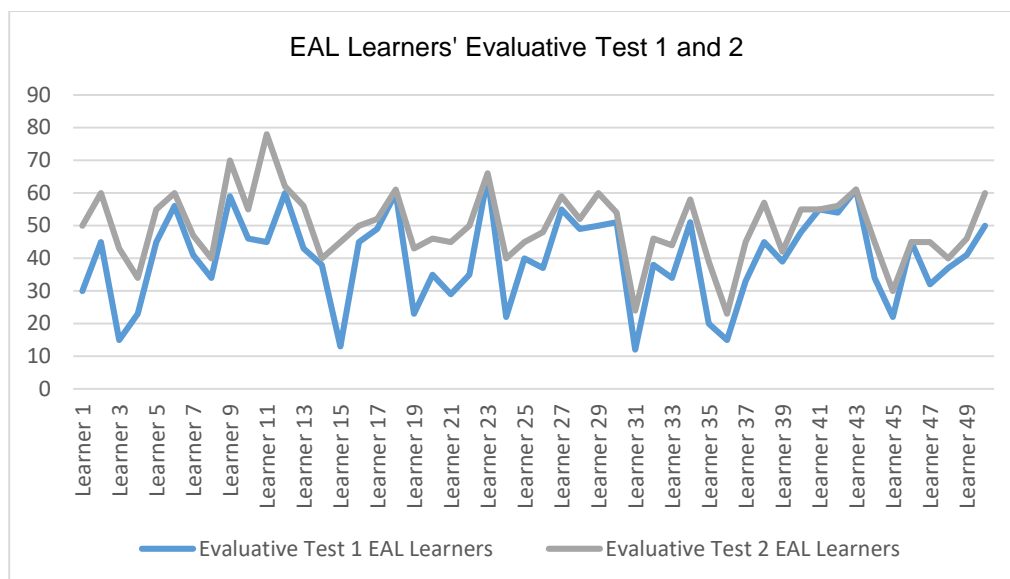


Figure 4.20: EAL learners' MFL evaluative test 1 and evaluative test 2



4.5.2 Discussion

After the structured, consistent use of TEL in instruction, the test scores of EAL learners increased significantly, but still did not match those of their peer group. This supports Cummins (2010) assertion that EAL learners can develop English for survival in one year, and English for conversation in two to three years, but that it takes five to seven years for bilingual learners to gain competency in a second language on a par with their first language English-speaking peers in academic performance. Therefore, TEL by itself may not lead to improvement in EAL learners' language skills (Harklau, 1999; Cummins, 2000). EAL learners require ongoing assistance during KS3 and KS4 if they are to improve their English writing (Cameron, 2003).

There is substantial evidence that development, even for EAL learners who have lived in the UK for a decade, differs from that of first language English speakers (Barnett, 2002). Fluency in spoken English is normally gained in two years; however, being able to read and comprehend a difficult text, and write the academic English required for success in examinations, can take significantly longer (Ofsted, 2001).

Consistent, structured use of TEL in teaching and learning tends to produce small levels of improvement in comparison with other approaches, such as peer tutoring or

the provision of more effective feedback to learners (Hennessy, 2010). The findings from these data suggest it is not simply the use of TEL which makes the difference (see Chapter 2 for further discussion in reviewed literature). How well TEL is used to assist teaching/learning is also a significant consideration. There is no question that TEL engages EAL learners, but this advantage is a benefit for learning only if an activity is effectively matched with learner-centred pedagogical approaches. Thus, what is important is the pedagogy of the application of TEL in the classroom: the 'how', not the 'what' (Hennessy et al., 2010).

The improvement in English test scores for EAL learners, which was not equivalent to the academic level of their English as a first language peer group, indicates that TEL may be more suitable as a supplementary teaching/learning tool in the context of developing English language acquisition for EAL learners. This means it needs to be used in collaboration with other second language acquisition (SLA) teaching/learning strategies (Anderson, 2016; Lorente, 2008). There is compelling evidence in the literature (see Chapter Two) that gains in attainment, following the use of TEL, tend to be greater in some subject disciplines – for example, mathematics and the sciences – than others; and that there also tends to be variation within subject-specific areas, such as within literacy (Chen, 2010; Warschauer, 2011). Therefore, the impact of structured, consistent use of TEL can be greater in some situations than others. This clearly seems to be the case with the EAL test results reported in this study.

The overarching implication here is that the use of TEL is a catalyst for change; therefore, it is vital to understand how the structured, consistent use of TEL can bring about positive improvements and make teaching/learning practices more efficient and effective. Focusing on change and the process of change in terms of learning is, therefore, essential in supporting the effective use of TEL for EAL learners in secondary schools (Warschauer, 2011; Peterson, 2011).

Regarding variations in progress in English, Bialystok and Miller (2000) and Cameron et al. (1996) explain that EAL learners can be categorised based on their stage of English language acquisition: this strongly influences learning and teaching strategies and their academic attainment after the structured, consistent use of TEL. The diversity of EAL learners, and their particular needs caused by learning in a different language, with different backgrounds, understandings, and expectations of education, language and learning, influences their academic and cognitive development (Jewitt, 2008). The

English test results raise further aspects for consideration: for example, could the higher scores in mathematics be related to its requirement for more analytical skills and specific, precise, logical processes. Furthermore, Zhao (2013)'s argument that the use of TEL without consideration of pedagogical practices does not necessarily improve academic attainment raises different arguments concerning the efficacy of TEL on its own (Parr and Fung, 2000; Andrews et al., 2002; Cox et al., 2004; Hartley, 2007; Shuib and Azizan, 2015).

To summarise, evaluative testing of the EAL learners involved in this study was undertaken to ascertain the impact of the use of structured, consistent TEL on their attainment. The test results of EAL learners before and after phase 2 of the main study were compared with those of their English as a first language peers and improvements in test scores were noted. Structured and consistent TEL integration, in all three subjects, had a clearly positive effect on the test scores of EAL learners and the results gap was narrowed.

4.6 Chapter summary

This chapter has presented and discussed data gathered from the following data-collection tools: teacher and learner questionnaires, lesson observations, teacher focus group discussions and the evaluative test 1 and 2 results. The findings have been presented and their implications drawn. An indication of the various forms of TEL used across the school has also been provided. In response to the main research focus of this study, analysis of data from teacher and learner participants clearly indicates that TEL has the potential to make a positive impact (Parr and Fung, 2000; Andrews et al., 2002; Cox et al., 2004; Hartley, 2007). Questionnaire data indicated that teachers were willing to embrace the structured and consistent use of TEL as a teaching/learning approach and resource.

CHAPTER 5 - ANALYSIS

5.1 Introduction

The reasons for the low academic performance of many EAL learners have been explored in several research studies (Hutchinson et al., 2003; DfES, 2003; Dennie and Hall, 2012; Arnot et al., 2014) while these studies have been disputed by several researchers (Anderson et al., 2016; Archibald, 2008). While these debates continue, the number of EAL learners entering British schools is increasing (Arnot, 2014; NALDIC, 2003; Press Reader, 2016). It is, therefore, increasingly important to explore and develop support mechanisms to enhance the educational attainment of EAL learners.

Several studies have examined strategies applicable to secondary school EAL learners. One such approach is the use of TEL in the classroom (Lee, 2003). The use of TEL has, however, provoked considerable debate among researchers (Zhao, 2013). While some argue for its positive impact (Parr and Fung, 2000; Andrews et al., 2002; Cox et al., 2003; Hartley, 2007), others offer strict words of caution (Shuib and Azizan, 2015; OECD, 2015).

Joining this discussion, the present study explores the impact of TEL on EAL students' learning in English, mathematics and MFL in Faith Valley School. To this end, the research examines how EAL learners engage with and respond to TEL approaches strategies, and considers the impact of this on their learning experience.

The study used the explanatory, sequential, mixed-methods approach employing questionnaires, focus group discussions, classroom observations, and document analysis of evaluative testing to gather data. The research has identified and explored TEL strategies used in the three subjects mentioned above. The analysis of its findings responds to the following three research questions:

- 1) What are the TEL strategies that teachers use to benefit EAL learners in their teaching of English, mathematics and MFL?
- 2) How does the use of TEL practices benefit EAL learners in attainment and improved exam results in English, mathematics and MFL?
- 3) How do EAL learners assess the benefits of TEL?

In the following sections, the findings are analysed in relation to each exploratory question.

5.2 Exploratory question 1: What are the TEL strategies that teachers use to benefit EAL learners in their teaching of English, mathematics and MFL?

This question seeks to explore TEL practices used by teachers. TEL is briefly defined, and its use for learning is analysed in each of the three subjects to set the context. This is followed by an overview of findings.

5.2.1 Definition of TEL

As noted in Chapter Two, TEL is a complex term that does not lend itself to a straightforward definition. For the purposes of this study, it is defined as simply the application of information and appropriate communications technology to support teaching and learning for the purpose of motivating, engaging and ultimately improving the academic attainment of EAL learners.

The responses to the questionnaires in this study revealed that many different TEL strategies and resources were used by teachers of English, mathematics and MFL. These resources included interactive whiteboards, overhead projectors, computers, the internet, web-based teaching-materials, camcorders, scanners, printers, digital videos, cameras and voice recorders, video conferencing, podcasts, overhead-projectors, laptops, virtual and managed learning environments, and tablets.

5.2.2 TEL use for learning mathematics

Previous studies have indicated that the strategic use of TEL can aid the learning of mathematical procedures and skills, including advanced mathematical proficiencies such as problem-solving, reasoning and justifying (Pierce and Stacey, 2010; Gadanidis and Geiger, 2010; Kastberg and Leatham, 2005; Nelson et al., 2009; Roschelle et al., 2000; Suh and Moyer, 2007).

Lesson observations and focus group discussions revealed that, in the study of mathematics, the TEL strategies most commonly used to deliver the curriculum were online resources, including web-based content, YouTube tutorials, commercial mathematics practise-work, Logo software, specialist software, computer algebra

systems (CAS), computers, graphic calculators and computerised graphing, animations and simulations. These resources assisted learners in understanding and consolidating concepts they had learned. EAL learners were able to engage in practise-work specialist software, simulations and drills, and practise-subject content software, gaining proficiency with, practising and interacting with these resources. There was, however, no evidence of the acquisition of advanced mathematical proficiencies.

Both content-specific and content-neutral technological tools were used. In mathematics classes, content-specific technologies consisted of CAS and dynamic geometry environments. Other technological tools included data-collection and data-analysis devices, and computer based applications. These supported EAL learners in exploring and identifying mathematical concepts and relationships.

Logo software was periodically used in mathematics lessons. This served as a motivator, encouraging EAL learners to develop problem-solving skills, while the aim was to help learners respond to feedback. There was no visible evidence that it aided in the development of problem-solving skills in EAL learners; however, Logo software did help the learners to develop and improve their social interactions and collaborations (Yelland, 2003). Knowledge and skills gained from using Logo are transferrable to geography, in activities such as map-reading (Sarama and Clements, 2001).

Based upon observations in mathematics lessons, questionnaires and focus group discussions, one of the main points identified was the wide range of technology available for study use. Yelland (2003) noted that Logo software offers many opportunities for collaborative practise in the mathematics classroom, and this was supported by the findings of this study. Kennewell (2003) reported that patterns, associations and an increase in analytical skills all relate to higher levels of TEL use and the teachers supported this view both in the observed lessons and in focus group discussions.

The use of mathematics curriculum software and CAS were found to enhance learners' skills and understanding of algebra (Hennessy et al., 2010), while mathematics curriculum software motivated both teachers and EAL learners, fostering an in-depth understanding of the subject matter and improved learning opportunities (Hennessy et al., 2010). Its use, in conjunction with interactive whiteboards in whole-class teaching,

was found to help overcome EAL learners' apprehensions, allowing them to demonstrate their abilities (Richardson, 2002). It has been suggested that the strategic use of TEL in a mathematics programme strengthens the teaching and learning of the subject (Dick & Hollebrands, 2011). However, as confirmed during focus group discussions and lesson observations, simply accessing TEL is insufficient, and the teacher and curriculum play essential roles in mediating the use of technological tools (King-Sears, 2009; Roschelle et al., 2000; Suh, 2010). For example, graphic calculators and computerised graphing technology were observed to be widely used in lessons that required EAL learners to plot and create graphs. Technology accelerated the graphing process, freeing pupils to concentrate on other aspects of the topic that required analysis and reflection on the relationships between the data. The use of this type of technology is not necessarily surprising for a mathematics lesson (Hennessey et al., 2001). However, Hennessey (2002) observed that between 67 per cent and 80 per cent of KS3 and KS4 learners do not use TEL in the mathematics classroom. The contradictory findings are attributable to three factors: first, it is unclear how Hennessey (2002) classifies technology; second, teachers in the current study made an active choice to incorporate TEL into lessons, which creates a different outcome; and third, the study by Hennessey (2002) was conducted over a decade ago and these findings may be outdated.

5.2.3 TEL use for learning English

Clickers and classroom response systems were used for content delivery in English, while other TEL strategies, such as multimedia tools, interactive whiteboards, web-based content, language-modelling software, video-based tutorials and computers played a noticeable role in curriculum delivery. Computer reading-based programmes, computer assisted language learning (Education City's 'Learn English' software), multimedia software, electronic dictionaries, and reading CD-ROM-based newspapers were also occasionally noted.

The English teachers observed were 'tech-savvy' and embraced EAL learners' interest in 'digital play' by creating opportunities for learning language and content through computer games. TEL was used for all sorts of language learning tasks, such as oral practice and reading, writing and skills development. However, as suggested in a study by Beckett and Miller (2006), TEL seemed particularly beneficial when integrated into project-based language learning. Here, EAL learners were allowed to acquire English

naturally through theme based activities and different topics in a variety of subject areas. These consisted of sequences of content-driven, language-based activities that culminated in a significant event, such as an oral presentation, or specific tasks, such as writing letters or essays. The internet also provided access to large quantities of authentic input material and simultaneous opportunities for practise.

EAL learners engaged in teacher-led question and answer sessions were allowed to watch videos, conduct research using books and the internet, take part in role play and debates, and experience any number of other activities all geared towards understanding content. Throughout these lessons EAL learners were allowed to engage in 'blended learning' through using TEL, as and when required. One of the main findings in the literature was that teachers who combine TEL with high-quality assistance are the most effective in teaching English (Kennewell, 2003; Mumtaz and Hammond, 2002). The English teachers in this study combined teaching techniques in this manner; so that, not only were they freely able to discuss the benefits of TEL in their classrooms during the focus group discussions, but TEL practice was also consistently observable in the classroom.

5.2.4 TEL use for learning MFL

The MFL department adopted a range of TEL strategies and tools, including online resources, as well as technologies such as computer-assisted language learning. In addition, internet based language learning, online language learning, Google assisted language learning, and technology enhanced language learning techniques were also used. Other technologies included mobile assisted language learning, digital video and photography, and language modelling software, while CD players and multimedia software were also popular. The different forms of technology based language learning resources helped EAL learners to grasp the concepts taught, and as they engaged in lessons they became confident in their use.

During the classroom observations, it was noted that the use of multimedia technology combined with appropriate instructional design created a safe learning environment that led to what teachers perceived to be effective language learning and which learners experienced as highly motivational. The use of internet based learning, such as via YouTube, was highly influential in helping MFL EAL learners to improve their listening and speaking skills. It was also observed in lessons, and the data in evaluative

testing, that the reading and writing of EAL learners improved considerably through the adoption of TEL. Computer-based technologies used by teachers were more useful than conventional reading methods in literacy development: EAL learners could write better and improved their collaborative writing skills. Personal digital assistants and laptop devices proved considerably more efficient than traditional modalities, creating a mobile language-learning environment for EAL learners. However, it is essential to note that these web-based technologies were used in combination with traditional writing instruction. This finding is consistent with the literature, as the research suggests that TEL resources in MFL provide access to a wide selection of information and learning avenues (Passey et al., 2004). In addition, because there is time to pause and revise material, EAL learners can more easily review information they do not understand, and this has been linked to higher levels of motivation among EAL learners (Kennewell, 2003).

In the observed lessons, questionnaires and focus group discussions it was noted that MFL teachers encouraged EAL learners to use search engines such as Google, Yahoo and Bing. EAL learners were allowed to browse these search engines, as well as using their associated translation tools. The use of these strategies improved EAL learners' language-learning and writing skills, as demonstrated in their evaluative test scores. Similarly, Google-assisted language learning was identified as especially beneficial by teachers and learners during lesson observations and focus group discussions. Google can translate into many languages, and maps, images, and videos could be downloaded for language-teaching purposes. Google was useful for both teachers and EAL learners, and both groups used Google materials related to teaching and learning language.

The results indicated that EAL learners exposed to these types of teaching/learning resources were more likely to use them independently at a later date. Similarly, writing blogs helped EAL learners to learn independently, while developing intercultural knowledge and linguistic skills. In this manner, they not only improved their writing skills but also obtained an understanding of the culture of the target language. This is consistent with the MFL Classroom Project conducted by CILT (2005), in which small tasks emphasising collaborative skills fostered independence and activated deeper cultural awareness in EAL learners.

During MFL lessons, some EAL learners preferred to learn a new language through

electronic technology rather than face-to-face in the classroom. Practise and confidence were the cornerstones to teaching MFL, and internet-based language-learning provided EAL learners with opportunities to practise with confidence. In turn, this increased the enthusiasm of EAL learners, which has been noted as an advantage of TEL communication in MFL (Harrison et al., 2002).

Internet and software-use interacts in many ways that books and audio cannot. Some of the software used recorded EAL learners and analysed their pronunciation before providing feedback; additional exercises were suggested in areas where particular EAL learners had difficulty, until the concepts were mastered. Some of the software could pronounce words in the target language and show their meaning using pictures instead of oral explanations. The only language generated by such software was the target language, and this was comprehensible regardless of the learner's first language.

MFL teachers demonstrated the most confidence with TEL and the most flexibility with EAL learners using TEL materials. This may be due to the abundance of tools developed for the foreign language classroom, which improve EAL learners' pronunciation and overall linguistic skills (Becta, 2004).

In MFL lessons, teachers employed other traditional teaching strategies alongside TEL. There was substantial evidence of 'blended learning' (which was also used in English lessons), skills teaching, the sandwich technique, mother-tongue mirroring and back chaining. Blended learning is a combination of face-to-face instruction and distance education, which is substantially online in nature. In skills teaching, MFL teachers taught the four basic language skills of listening, speaking, reading and writing, as well as summarising, describing, narrating and study skills. EAL learners were allowed to work with each other in pairs and in groups, even sometimes with the entire class. Paired and group work provided opportunities for more EAL learners to actively participate. However, group and paired work required extensive supervision to ensure everyone participated. These activities also provided opportunities for peer teaching, in which struggling EAL learners derive support from more confident classmates. During language practise sessions, teachers provided idiomatic translations of unknown phrases in EAL learners' first languages, repeating these to convey meaning as rapidly as possible.

5.2.5 Overview of findings

The teachers' responses to the questionnaires supported the fact that a range of TEL strategies and equipment were used in lessons, ranging from interactive whiteboards to virtual environments, tablets and web-based tutorials. The majority of the teachers indicated that they faced challenges using TEL to prepare lessons; however, they highlighted no issues in using TEL to deliver lessons. These findings may help future researchers to probe the issue of teacher training and level of competency in the use of TEL to prepare and teach in more detail, in order to verify whether the level of TEL competency affects whether teachers use TEL in their teaching. The questionnaire responses further revealed that teachers were ready to embrace the use of TEL in teaching EAL learners. Willingness to use TEL is an indication that the benefits of adopting TEL in teaching may far outweigh the difficulties posed. Teachers' responses to the questionnaire provided useful insights into their perceptions of the use of TEL in teaching/learning. They also indicated the possible impact on the academic progress of EAL learners when adopted consistently and integrated into classroom practice in a structured manner. The results generated were, to a large extent, positive, and suggest that TEL in teaching could produce positive outcomes for EAL learners' attainment when used correctly, together with the relevant teaching/learning strategies.

The question sought to establish TEL strategies and resources used by teachers and the types of TEL with which they engage when teaching. It emerged that a wide range of technologies and online software and learning tools were used. Classroom observations and focus groups discussions indicate that these were predominantly online resources (web-based content, YouTube tutorials, commercial mathematics practise work, Logo, specialist software, CAS, portables and mobile technology, computers, graphic calculators and computerised graphing, animations, and simulations). These benefits were valuable and assisted EAL learners to understand and consolidate concepts that they had learnt. EAL learners were able to engage in practise using specialist software, simulations and drills, and practise using subject content software. They gained proficiency with practise and interactions with these technologies. TEL further supported EAL learners in exploring and identifying mathematical concepts and relationships. EAL learners' skills and understanding of algebraic systems had conspicuously improved. TEL strategies contributed significantly to the common classroom resources used, such as online teaching

resources, blackboards, textbooks and cassette players.

5.3 Exploratory question 2: How does the use of TEL practices benefit EAL learners in attainment and improved exam results in English, mathematics and MFL?

This question probed how teachers' ideas and notions about EAL learners influenced the way EAL learners were taught and the TEL practices adopted to support their attainment. Firstly, focused group discussions revealed that some teachers did not have a substantial understanding of how EAL learners acquire English language, the different stages of language development, and how to teach EAL learners with an English language barrier (Strand, 2002). The classroom observations and focus group discussions revealed that some of the teachers did not know how to differentiate teaching/learning resources to match the varied ability levels of EAL learners. To one teacher, these EAL learners were simply lazy, as they seemed to make minimal attempts to understand the English language. The majority of teachers were positive, however, in questionnaires and focus group discussions and believed that incorporating TEL strategies consistently into their teaching could significantly improve the academic attainment of EAL learners. In general, they were eager and determined to help EAL learners make progress in the three mentioned subjects. In addition, they were interested in how TEL strategies could be incorporated effectively to improve their practices. As shown in Chapter Four, some teachers acknowledged that teaching an EAL learner was a daunting, challenging task, and that they usually felt inadequately prepared during lessons. However, they were still eager to incorporate TEL strategies into their practice in order to facilitate the teaching/learning process and make learning an enjoyable experience for EAL learners.

Analysing the data gathered from the teacher questionnaires and focus group discussions and lesson observations suggests that there is a clear indication that teachers held mixed perceptions of EAL learners' abilities and learning; however, these perceptions did not have any significant impact on their instructional practices or the delivery of subject content in the teaching and learning process for EAL learners, as demonstrated in the increase of scores in evaluative test 2 results (see Chapter Four). The literature review also presented contrasting perceptions about teachers' attitudes towards the teaching of EAL learners and their academic abilities. Several qualitative

studies, exploring the schooling experiences of EAL learners, alluded to the attitude of school teachers, in government funded schools, towards EAL inclusion. Teachers in these studies were portrayed as holding negative and unwelcoming attitudes (Fu, 1995; Olsen, 1997; Schmidt, 2000; Valdes, 2001), as well as positive and welcoming attitudes (Harklau, 2000; Reeves, 2004; Verplaetse, 1998). In terms of the impact of EAL learners' inclusion in the classroom learning environment, some teachers are concerned about the possibility that EAL learners will slow the class's progression through the curriculum (Youngs and Youngs, 2001) which may result in inequities in educational opportunities for all students (Platt et al., 2003; Reeves, 2004; Schmidt, 2000). Finally, some evidence of subject-area teacher attitudes and perceptions of EAL learners is present in research, including a reluctance to work with low-proficiency EAL learners (Platt et al., 2003), misconceptions about the processes of second-language acquisition (Olsen, 1997; Reeves, 2004; Walqui, 2000), and assumptions (both positive and negative) about the race and ethnicity of EAL learners (Harklau, 2000; Valdes, 2001; Vollmer, 2000).

To establish whether TEL positively impacted EAL learners' attainment, test scores before and after phase two of the main study were compared (evaluative test 1 and evaluative test 2). Comparing the test results obtained by EAL learners in the three subject areas, it was clear that they had considerably improved their test scores in evaluative test 2. This might suggest that the learners' knowledge in their respective subject areas had improved and that EAL learners were engaging with the curriculum content owing to the consistent use of TEL in their lessons.

It was evident that, prior to the introduction of the consistent and structured use of TEL in lessons, EAL learners' test scores in evaluative test 1, for the three subject areas, were low in comparison to their peers, who were competent in English as a first language. Some learners scored as low as 20 per cent in their tests and the lowest result for an EAL learner was in English. However, after structured and consistent use of TEL, evaluative test 2 scores had improved from 20 to 29 per cent in English. The majority of EAL learners were scoring in the range of 50 to 60 per cent. Interestingly, there were four, stage one (Cummins, 2000) EAL learners, who did not improve their English test scores, but who did improve their test scores in mathematics and MFL.

Mathematics showed the greatest positive improvement in test results. This could be attributed to a variety of reasons, including the fact that this is a highly technical subject

but requires minimal language skills, or simply because the TEL techniques adopted by the teachers, observed in lesson and shared in questionnaires and focus group discussions, were highly effective and efficient. It could also be that teachers had good TEL practices and were better able to tailor content to match TEL strategies and EAL learners' development requirements. EAL learners' Interest in the subject may also have been a contributing factor. The evaluative test 2 results in mathematics after the consistent application of TEL ranged from 40 to 80 per cent (see Chapter Four).

Consequently, EAL learners using TEL in mathematics are better able to imagine and explore the realms of mathematics. If EAL learners are better able to comprehend the subject, they are likely to perform better during assessments. These findings are consistent with previous research on learner comprehension in mathematics, which has suggested that animations and simulations improve comprehension (Cox et al., 2003).

There was clear evidence of progress in English, as demonstrated by the assessment test scores, suggesting that the use of TEL has the potential to positively impact EAL learner attainment. Prior to the consistent use of TEL in the teaching and learning of English, only 34 per cent of EAL learners had made considerable progress in English, but by the end of the consistent use of TEL 66 per cent of EAL learners had made progress (see Chapter Four).

There were mixed perceptions in the literature about TEL use in English for EAL learners. While previous studies have suggested that TEL might help via storybook creation with 'authentic language', they suggest that there are limits to what can be achieved (InterActive Education, 2006). This is probably because there needs to be communication and discussion in English for improvements to occur. In some instances, if EAL learners work independently using TEL, they may miss learning opportunities.

In MFL, EAL learners showed improvements in their test scores after the consistent and structured use of TEL in the teaching and learning practice. The majority of EAL learners scored above 50 per cent, and a few came within the 60 to 70 per cent range. The evaluative test 2 results showed significant improvements after the consistent and structured use of TEL (see Chapter Four).

Linguistic and collaborative skills generally increased with TEL use (CILT, 2005);

consequently it is unsurprising that improvements in these skills led to better results in evaluative test 2. TEL use can benefit motivation, enthusiasm and confidence which, in turn, have been perceived to have a positive impact on learners' attainment, and therefore these findings are consistent with those of previous studies (Harrison et al. 2002).

The evaluative test 2 results of EAL learners showed clear improvements, which indicated that learners' knowledge in their subjects had improved due to the consistent and structured use of TEL in teaching and learning of the subject. The greatest positive improvement was in mathematics, which could be attributed either to the minimal requirement for the use of language skills or to the highly effective TEL techniques adopted. The findings for mathematics were consistent with previous research, which has suggested that animations and simulations improve mathematical comprehension (Cox et al., 2003). In English, there was also clear evidence of some progress, suggesting that the consistent and structured use of TEL could positively impact on EAL learners' attainment. A comparison of the evaluative test 1 and evaluative test 2 scores (after the consistent and structured use of TEL in teaching and learning) showed that 32 per cent more EAL learners had improved their test scores. While only 34 per cent had made progress before the consistent and structured use of TEL, 66 per cent had made progress in evaluative test 2. This substantiated the assertion by CILT (2005) that linguistic and collaborative skills are generally increased with TEL use. The findings of this study on the benefits of TEL, in terms of motivation, enthusiasm and confidence to increase attainment, were consistent with those of previous studies (Harrison et al., 2002).

5.4 Exploratory question 3: How do EAL learners assess the benefits of TEL?

To measure how EAL learners assessed the benefits of TEL, their engagement and attitudes were examined through learner questionnaires, lesson observations and evaluative test results. As much of the data was quantitative in nature, it was analysed using the statistical tool, SPSS software. Questionnaires solicited EAL learners' perceptions about the impact of TEL on their learning and the responses received were further validated against EAL learners' evaluative test scores. The areas that the questionnaire considered included EAL learners' opinions about whether TEL had

improved their test scores, curriculum engagement, independent learning and ability to meet specific subject learning objectives, and learning in other subjects. To determine whether EAL learners believed that TEL significantly influenced their test scores in English, mathematics and MFL, the questionnaire responses and evaluative test scores of the EAL learners were analysed.

Based on their questionnaire responses, EAL learners supported the use of TEL for learning in each of the three subjects. EAL learners were able to identify, not only that their learning in these areas improved, but also in which specific areas they benefited the most. It is unsurprising that EAL learners were concerned with obtaining better test scores and higher attainment results, as the current UK education system uses standardised testing to demonstrate attainment levels. Overington (2012) indicates that current UK policy highlights the need for all EAL learners to be incorporated into subject based classrooms, and acknowledges that rapid language-acquisition may not be possible. This is demonstrative of reoccurring problematic nature of a one-size-fits-all approach to teaching EAL learners.

The learner questionnaire showed that EAL learners had positive perceptions about the use and benefits of TEL. This was also demonstrated by their engagement with TEL during observed lessons. These findings are consistent with the literature, which suggests there are benefits to TEL use in secondary school classes (Haddad and Draxler, 2002; UNESCO 2003; Isman et al., 2007).

Table 5.1 below reports the correlations for EAL learners' perceptions of TEL and evaluative test score improvements in the three subject areas.

Table 0.1: Pearson's correlation of TEL and improvement in test scores

Variables	Mean	Standard Deviation	Df	R	P
Mathematics	6.47	2.41			
English	5.01	2.14			
MFL	1.54	1.33			
Pearson's correlation			47	0.501	0.390

The mean scores for test score improvements in the three subjects were correlated, and this revealed that there was a significant improvement in learners' test scores in all three subjects related to the use of TEL [$r(47) = .501, p = 0.390$]. The responses to the learner questionnaire were also analysed to determine the extent to which other variables, such as curriculum delivery, independent learning, subject-specific learning objectives and learning other subjects were influenced by the application of TEL, and significant correlations, as outlined below, were found for most of the variables listed.

5.4.1 Impact of TEL on curriculum delivery

There was a significant correlation between TEL and curriculum delivery [$r(47) = .067, p = 0.253$], indicating that TEL significantly affects this factor (Table 5.2).

Table 0.2: Pearson's correlation of TEL and curriculum delivery

Variables	Mean	Standard Deviation	df	R	P
TEL	1.7	1.45			
Curriculum delivery	1.0	1.14			
Pearson's correlation			47	0.067	0.253

The results presented in Table 5.2 indicate a mean score of 1.71 for TEL, with a standard deviation of 0.45. Furthermore, the mean score for curriculum delivery was 1.01, with a standard deviation of 0.14. The findings may reflect the fact that TEL enables EAL learners to experience a learning environment and context first-hand, through multimodality, providing them with reliable, trustworthy, 'authentic' insight (Ernest, 1999; McMahan, 1997).

5.4.2 TEL and independent learning

The analysis revealed that TEL did not improve independent learning (Table 5.3).

Table 0.3: T-test analysis of effect on TEL and independent learning

Variables	Mean	Standard Deviation	df	R	P
TEL	2.18	1.0			
Independent learning	1.12	0.13			
TEL use	1.05	0.15			
t-test			47	- 0.314	0.218

The results presented in Table 5.3 indicate a mean score of 2.18 for TEL with a standard deviation of 1.0. The mean scores for independent learning were 1.12, with a standard deviation of 0.13. The means were compared using an independent t-test (used to assess whether the means of two groups are statistically different from one another), which indicated a significant difference between the use of TEL and independent learning. The results revealed a significant difference between TEL [M= 2.18; p = 1.0] and independent learning [M= 1.12; p = 0.13] and TEL use [t = -0.314; p = 0.218]. Thus, the use of TEL was found not to support independent learning for the three subjects in this context.

Previous research has indicated that incorporating TEL into lessons enhances learner attainment and achievement, specifically in relation to summative assessments (Higgins, 2007). TEL, however, did not necessarily improve independent learning (Eng, 2005). This is consistent with the findings of this study, where EAL learners performed consistently better evaluative test 2 after the consistent use of TEL but did not demonstrate any substantial improvement in independent learning.

5.4.3 TEL and subject-specific learning objectives

In addition to the specific effects of TEL on EAL learning, TEL use was examined more generally. Previous research has indicated that EAL learners may have different social or cultural needs compared to speakers of English as a first language (Holmes and Cooper, 2004; Rummens, 2001). Learning is a complicated process, involving parents, peers and other support to build higher order analytical skills (Bhugra, 2004). However, self-determination and the need for EAL learners to individually persist with tasks is

also important (Dyson, 2004). The ways and subjects in which TEL might be useful in EAL learners' development, both at home and in the classroom, were therefore examined.

TEL in curriculum delivery and realisation of subject-specific learning objectives were not found to be significantly correlated [$r(47) = -0.171, p = 0.044$] (Table 5.4).

Table 0.4: Correlation between TEL and subject-specific objectives

Variables		Mean	Standard deviation	Df	R	P
TEL		3.19	0.58			
Subject specific objectives		1.01	0.14			
Pearson's correlation				47	-0.171	0.044
Respondents (n = 50)						
Variables	Variable	df	R	Sig		
TEL	E Learning					
SS objectives	S object	47	-.171	.044		

The results presented in Table 5.4 show a mean score of 3.19 for TEL with a standard deviation of 0.58. The mean score for subject-specific objectives was 1.01 with a standard deviation of 0.14. No significant correlation was found between TEL and SS objectives [$r(47) = -.171, p = .044$].

5.4.4 TEL and learning other subjects

An analysis of whether TEL aided the learning of other subjects revealed that TEL significantly enhanced it, as shown in Table 5.5.

Table 0.5: Correlation between TEL and other subjects

Variables		Mean	Standard deviation	df	R	P
TEL		3.08	0.46			
Other subjects		1.07	0.18			

Pearson's correlation		47	0.273	0.034
Respondents (n = 50)				
Variables	Variable	Df	R	Sig
TEL	E Learning			
Other subjects	other subject			
	H	47	.273	.034

The results presented in Table 0.5 show a mean score of 3.08 for TEL influence, with a standard deviation of 0.46. The mean score for other subjects was 1.07, with a standard deviation of 0.18. A significant correlation was observed between TEL and other subjects [$r(47) = 0.273, p = 0.034$].

Previous research has revealed that a variety of learning variables, including culture, language, religion and ethnicity, affect the learning context. These variables influence the academic performance of EAL learners as they grapple simultaneously with learning both English and the curriculum content (John & Ehow, 2011). This is a difficult task, requiring perseverance and focused learning strategies, and some EAL learners will find this too daunting and withdraw from academic pursuits (Cummins, 1989). Based on their performance, as not very fluent English speakers, EAL learners are sometimes perceived as lazy, while teachers may not realise that these EAL learners may in fact be encountering legitimate problems related to academic proficiency (John & Ehow, 2011; Murray & Christison, 2010; Susanna, 2007).

According to previous research, a deficit model is typically applied to learning by EAL learners, and a one-size-fits-all approach dominates the research (Goldenberg et al., 2006; McDermott, 1993). This approach challenges the significance of TEL by placing EAL learners in a situation in which they are accountable for falling behind. The findings of this study, and especially the measurement of the EAL learners' perception of the impact of TEL on their learning, demonstrates that TEL provides a level of engagement and differentiation, beyond traditional classroom teaching practice, available to EAL learners. Because differentiation strays from the one-size-fits-all approach, it facilitates a more equitable learning approach and opens the space for EAL learners to work and develop at their own pace.

5.4.5 Overview of findings

Data collected from the EAL learners' questionnaires were statistically analysed using criteria that applied across all three subject areas, which enabled the analysis of how EAL learners perceived the benefits of TEL in terms of improvement in their assessment results, curriculum engagement, independent learning, subject-specific learning objectives and learning other subjects.

The evaluative test results clearly showed that test scores had improved. The Pearson correlations for English, mathematics and MFL showed a substantial improvement in test scores for mathematics, 6.47, with a standard deviation of 2.41. In addition, the mean score for English was 1.01, with a standard deviation of 2.14, while the mean score for MFL was 3.54 with a standard deviation of 1.33. The three means were correlated. The results of the correlation, therefore, indicate that there was an improvement in learners' test scores in these three subjects. This implies that TEL may have a positive impact on EAL learners' attainment.

The impact of TEL on curriculum delivery was found to have a positive correlation, indicating that TEL affects curriculum delivery. Considering TEL and its impact on independent learning, there was a clear indication that TEL did not improve individual independent learning. However, the findings showed that EAL learners performed better in evaluative test 2 after the consistent use of TEL in teaching and learning practice. This supports previous research, which claims that incorporating TEL into lessons enhances learners' attainment (Higgins 2007; Eng 2005). The impact of TEL on subject-specific learning objectives was found not to be significantly correlated; however, a significant correlation was found between TEL and learning other subjects. This supports previous research findings, which indicate that a variety of learning variables (culture, language, religion and ethnicity) influence learning identities, and affect the academic performance of EAL learners as they grapple simultaneously with learning both English and the curriculum content (John and Ehow, 2011; Murray and Christiso, 2010; Susanna 2007).

5.5 Chapter summary

In this chapter, the research questions that guided the study have shaped the analysis of data. Research on EAL learners suggests that the consistent and structured

integration of TEL in classroom practice may facilitate EAL learners' improved attainment. It is important to consider how teachers can understand the diverse learning identities of EAL students and be responsive to their learning and development requirements. For instance, EAL learners are often at different stages of English language acquisition, which influences the learning and teaching strategies that will be the most effective (Cummins, 2000). The observed improvement in evaluative test 2 results may be attributed to the way in which TEL was incorporated into lessons and teaching approaches, influenced by teachers' willingness to embrace TEL despite the challenges they encountered.

The fundamental research focus on how TEL may impact EAL students' learning experience in English, mathematics and MFL has been explored. The following chapter provides a conclusion for this research study and proposes recommendations for professional practice and future research.

CHAPTER 6 – CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This mixed method research study, situated in a pragmatic paradigm, has explored the impact of TEL on EAL learning in English, mathematics and MFL in a single-sex, boys' secondary education, state funded school. This school is situated in the London Borough of Islington and, similar to the student profile in the borough, has a large EAL learner population. There are research studies that have explored the impact of TEL on learners' attainment in single subjects in primary school settings (Heidema and Mitchell 2012) and some studies have been conducted in secondary schools with high EAL learner populations (White et al. 2014). However, no such study has previously been done, at secondary school level, in the London Borough of Islington, even though there are prevailing disparities there in the achievement and attainment of EAL learners in comparison with their peers who are proficient in English as a first language (see Chapter One and Chapter Two). As an explanatory, sequential, mixed methods design study, located in a pragmatic paradigm, this research demonstrates that the consistent and structured use of TEL, for teaching and learning practice, can contribute to improving the attainment of EAL secondary school learners in English, mathematics and MFL. This research study adds to new learning about EAL learners' academic attainment and achievement within the London Borough of Islington. It explores TEL strategies, learners' and teachers' experiences and perceptions of engaging with TEL and teachers' knowledge and skills in the use of TEL in English, mathematics and MFL. It considers how TEL may contribute to supporting EAL learners to improve their attainment.

The findings from this study can make contributions to Faith Valley School and can provide a map, in terms of its success and limitations, for other secondary schools with a large EAL learner population across the Borough of Islington. Furthermore, findings that emerged from the study and the identification of practices that create a positive impact can be transferred to other subject areas, across the school, in order to contribute to improving EAL attainment in other subject areas.

Literature reviews in Chapter One and in Chapter Two showed that, over the past

decade, there have been contrasting arguments presented about the impact of TEL on students' engagement and learning. Some research studies claim that TEL can enhance literacy development and language acquisition, provide greater access to information, support learning, motivate students and enhance their knowledge and self-esteem (Boster et al., 2004; Tracey and Young, 2006). In contrast, other studies propose that TEL may not have a significant impact on students' learning (Boster et al., 2004). The findings that emerged in this study suggest that the structured and consistent integration of TEL has the potential to make significant contributions to the learning experience and attainment of EAL learners in Faith Valley School. This research may be used as a stepping stone for other researchers to probe emerging or related issues. As a small-scale study it can provide a point of reference, with its findings serving as a pilot study for subsequent, larger scale, research to deepen knowledge in this area, contributing to improved school EAL learning policies and efficient ways of strengthening the attainment of EAL learners.

6.2 The positive impact of TEL

There were clear indications, from the evaluative test 2 scores, that the consistent and structured integration of TEL in lessons supported and facilitated learning in the three subjects examined. Lesson observations also demonstrated motivated engagement and mastery of skills and concepts. Questionnaire responses from research participants made it clear that the application of TEL supported and assisted teaching and learning by making subjects easier to understand, more engaging, interesting and accessible whilst accommodating and being responsive to a variety of learning preferences (WestEd, 2002). These findings are also aligned with D'Ardenne, et al. (2013), who claim that the application of TEL made taught subjects more engaging and accessible. Tracey and Young (2006) also found that TEL enriches learning experiences by providing learners with abundant opportunities to build or modify their personal knowledge. The questionnaires also indicated that the integration of TEL based activities for repetitive practice contributed to developing learners' confidence and enabled them to improve proficiency and learn with more autonomy and independence. Similar to the findings of Jonassen et al. (2006), this study found that, on the whole, the integration of TEL in teaching practice contributed to improving EAL learners' progress and attainment. The improvements in the mathematics evaluative test 2 scores, for instance, were in line with the work of researchers such as Boster

(2004) who, in a study involving 2,500 learners, concluded that there was a statistically significant increase in mathematics test scores when students used digital video appliances. Training and professional development for teachers is an important component of successful TEL approaches. It could be suggested that because teachers in the study did receive some kind of training in the use of TEL, the researched gains of the use of TEL were evident. However, on-going professional, inquiry-based support may further enhance their TEL practices (Conlon, 2004). The implication is that such support should go beyond teaching skills in TEL use and focus on the effective pedagogical use of TEL to support teaching and learning aims (Cheung and Slavin, 2011).

6.3 Impact on attainment

Attainment may be viewed in a variety of ways: from the perspective of the teacher or department head, or of the EAL learner. Evaluative test 2 results, focus group discussions with teachers and the questionnaire results from learner participants indicated an association between the use of TEL in the classroom and an increase in learners' test scores. This finding is not novel, but is consistent with previous research, and is useful as TEL becomes more prevalent (Schacter, 1999).

The study revealed, in addition, that learners' perspectives on attainment are positive. With better study habits and the ability to apply TEL in the classroom in multiple subjects, learners have the opportunity to work efficiently and perhaps more independently, resulting in an overall better level of attainment. This study, just like other studies linking the provision and use of TEL with improved attainment (Baker et al. 1994; Mann, 1999; Weglinsky, 1998) found consistent positive associations with educational outcomes. It is possible that the positive findings that emerged in this study may not be generalisable because the research involved a small sample size. Conversely, some research studies suggest that there is no significant linear connection between the use of TEL and enhanced learner attainment (Lee, 2016; Sivin-Kachala, 1998). The research findings propose that what makes the difference is not so much whether (or not) TEL is used, but rather, how well TEL is used to support teaching and learning (Lee, 2016). There is no doubt that TEL engages and motivates EAL learners. However, this benefit is an advantage for learning only if the activity is effectively aligned with what is to be learned. It is, therefore, the pedagogy of the

application of TEL in the classroom which is important: the 'how' rather than the 'what'. This is a crucial lesson emerging from the research, and careful thought is thus needed to use TEL to best effect.

6.4 EAL learners' English language development

There was also a clear indication that being at different stages of English language development impacted on the learners' English evaluative test 1 and evaluative test 2 scores. These findings correspond with the assertion of Cummins (2000) that EAL learners could develop English for survival within one year, and English for conversation in two to three years, but that it took approximately five to seven years or more for EAL learners to gain competency in a second language on a par with their English as a first language peers. Furthermore, in agreement with the perspective of Cameron (2003), focus group discussions with teachers revealed that EAL learners required ongoing assistance with language skills during KS3 and KS4. As teaching and learning practice was more oriented towards GCSE assessments, teachers found that KS4 EAL learners were struggling the most in terms of achievement and attainment in English writing. There is substantial evidence that EAL development, even for learners who have lived in the UK for a decade, is different from that of first language English speakers (Barnett, 2002). Fluency in spoken English is normally gained within two years; however, being able to read and comprehend difficult texts, and to write the academic English required for success in examinations, takes significantly longer (OFSTED, 2001). It also supports the findings of Bialystok and Miller (2000), who suggest that EAL learners can be categorised based on their stage of English language acquisition, and that this strongly impacts on learning and teaching strategies. EAL learners have particular learning needs owing to studying in a different language and diverse learning identities with different backgrounds and expectations of education, language and learning (NALDIC, 1999). Taken together, these aspects influence their academic and cognitive development and, more specifically, their language and learning development needs (Jewitt, 2008).

6.5 Teachers' perceptions about the benefits of TEL for EAL learners

The study indicated that teacher participants had a positive attitude about using TEL to improve EAL learners' test scores (Stepp-Greany, 2002). Data gathered from

questionnaires indicated that teachers had a positive perception of incorporating TEL in teaching and learning practice. During focus group discussions they shared the view that the consistent, structured and systematic adoption of TEL in teaching and learning practice could generate positive outcomes in EAL learners' achievement and attainment when used with relevant teaching strategies. During lesson observations and focus group discussions, teachers expressed the perception that the consistent and systematic use of TEL in teaching could help to improve grades to a large extent in all areas (Boster, 2004). Both teachers and learners recognised the benefits of TEL in their English, mathematics and MFL classes. Teachers also shared that TEL made the teaching of their subjects accessible and more engaging and improved their instructional skills. This finding is in agreement with several research studies confirming that the use of TEL in teaching practice can improve teachers' instructional practices (Margaret et al., 2005; Beauvois, 1994; Cononelos and Oliva, 1993; Lunde, 1990; Sanaoui & Lapkin, 1992). However, they found that there was no improvement in the attention span of learners.

6.6 My professional development

As a novice researcher, I found that this study contributed to my understanding of a pragmatic paradigm and the mixed method research design and approach. This study has added to my confidence in integrating TEL practice into my work with EAL learners. I reaffirmed my belief that TEL practice in the classroom can be particularly beneficial for EAL learners because it offers many of them the opportunity to obtain better grades whilst gaining a sense of autonomy and confidence in their self-study tasks. This research study has increased my interest in policy and procedures on TEL and EAL learners and has introduced me to other educators who share a similar interest.

I came to understand that teachers commonly perceive all students who are not first language English speakers as a homogeneous group of EAL learners. This can be limiting in terms of the diverse backgrounds and learning identities of EAL students. A wider purpose of this research was to contribute, through this practical knowledge, to the wellbeing of EAL learners and the good practice of teachers. Although my research did not initially have a plan, one slowly began to evolve during my data collection process as I started to question how I could become a more effective teacher, subject leader and ethnic-minorities attainment leader as well as assisting teachers in

improving their instructional practices when teaching EAL learners.

Reflection helped me to recognise the need for a school-wide EAL/TEL strategy facilitating the structured and consistent use of TEL in teaching and learning practice. TEL was used in instructional practices across the school, but was not fully embedded in all subject areas or used in EAL teaching and learning in a consistent, planned and structured manner. I had a notion of what I aspired to realise in my practice and I was certain that improvements in EAL learners' attainment, across the school, were needed. I did not, however, set out to tackle EAL learners' attainment with a clear action plan in mind. My plan developed over time, as I learned more about TEL and leadership through this research study. My greatest struggle was with planning a course of action. This was required to develop and refine my research focus to suit my own 'working context' and 'personal value position' (McNiff et al., 2001: 36).

Over the years my leadership role has involved me in conceptualising and leading learner attainment improvement initiatives. Through the research process I gained deeper knowledge about the school's TEL culture, the staff and EAL learner academic performance, which refined my views about my role in the school. I now wanted to develop a research informed action plan, based on this study, which could provide direction to my work as a researcher/practitioner, a pedagogical leader and a change agent. For instance, I gained knowledge about TEL programmes for EAL learners from a research trip to a NALDIC conference; through British Educational and Technology Agency (Becta) career development programmes (CDP); and through the Cambridge Education Partnership, where TEL in EAL teaching and learning was prioritised and implemented with training programmes for teachers. I also had the chance to see TEL models being successfully implemented in flagship schools. The act of transferring this knowledge to our school also shaped my emerging plan of action. I also hoped to make use of research data and analysis to explore how the consistent and structured use of TEL may be approached, in terms of pedagogy, in order to contribute to EAL learners' attainment and achievement in standardised exams.

6.7 Strengths and limitations of the study

The study achieved the aims it set out to achieve (see Chapter One). It explored the impact of the structured and consistent use of TEL with EAL learners in English, mathematics and MFL teaching/learning practice. The study focused on the following

three research questions to develop this insight: 1) What are the TEL strategies that teachers use to benefit EAL learners in their teaching of English, mathematics and MFL; 2) How does the use of TEL practices benefit EAL learners in attainment and improved exam results in English, mathematics and MFL; and 3) How do EAL learners assess the benefits of TEL? One of the strengths of the study was its ability to incorporate the perceptions of learner and teacher participants into the study's data and analysis of findings. Adopting a mixed methods research approach, situated in a pragmatic paradigm, to gather data is useful and robust in generating and collating data. It facilitated data and method triangulation, which contributed to the validity and reliability of findings in response to the three research questions (Tashakkori & Teddlie, 2010). Nevertheless, the study has limitations in terms of methodological approach and sampling size.

As an explanatory, sequential, mixed method research design, the study had some methodological limitations. As a design, it provided the benefit of including quantitative methods, such as questionnaires and evaluative testing, to gain insights into the use and impact of TEL, in the teaching and learning of the three subjects being studied, by exploring content (the 'what'). The qualitative methods, such as focus group discussions and lesson observations enabled the exploration of the context (the 'why' and the 'how') (Albright et al., 2013). One of the challenges this design posed was with quantifying lesson observation data in order to facilitate combining qualitative and quantitative data in analysis. The decision to quantify qualitative data led to a loss of flexibility and depth. This occurred because qualitative codes are multidimensional while quantitative codes are one dimensional and fixed (Bazeley, 2004). An attempt to quantify the rich qualitative data produced one-dimensional immutable data (Driscoll et al., 2007). The other option was not to quantify the qualitative data obtained, but it became a very time-consuming and complex process, as it required analysing, coding and integrating data from unstructured to structured data within the constraints of the timeframe for this study (Driscoll et al., 2007). In addition, quantified qualitative data are vulnerable to collinearity (Roberts, 2000). Collecting and analysing qualitative data, with a small sample, affected the statistical procedures used in the study, such as the analysis of variance and t-tests. This proved a challenge for the design of the study in terms of adequate statistical power to support the study (Driscoll et al., 2007). Future studies utilising a mixed methods research approach could develop more detailed analysis, integration, and inferences to provide strong evidence that may help to inform

policy and practice (Johnson & Onwuegbuzie, 2004).

Efforts to make generalisations and claims with the study also raise issues about methodological rigour and credibility. It was therefore important that, for this study, I provided adequate descriptions for methodological justification (Meyer, 2001). This included reference to research paradigms that had shaped the study design. Without adequate description, the research design would not be easily understood and may distract from the significance of the research findings (Sandelowski, 2000). As Denzin and Lincoln (2018) suggest a limitation in the pragmatic paradigm is its flexibility in research approach which may create lack of clarity in the research study.

While this study has been responsive to the research questions it set out to explore, it has other limitations, one being the small sample size. Due to this small sample size, it may be difficult to generalise findings from the study to the varying contexts of diverse schools with a large or small EAL student population. The study, in other words, can only confidently make claims about the EAL learners in Faith Valley School. Though the research design may be replicated, the findings cannot be extended to diverse EAL learners and school systems. Being a small scale study in a single-sex school, replication of the study in a co-ed school may not necessarily give the same results. Neither would results necessarily be the same in a primary school setting, depending on an array of factors such as the instructional practices adopted by individual schools and teachers and the choice of specific subject areas for research focus. Also, the level of TEL use will determine and impact on the results of any research study. There could be variances in the schools in which the study is replicated such as single-sex girls' secondary schools; co-ed secondary-schools, or co-ed primary-schools. Even the location of the school, management practices, school ethos and TEL policies, among other factors, may impact on findings. The study pursues local relevance but can claim generalisation or allow for greater generalisations if several studies with local relevance in diverse settings provide similar findings. If, for instance, a comparable research approach produces similar outcomes in different schools, this could imply generalisation. Quantitative research methods may contribute to quantifiable findings that can be compared and contrasted with the quantified findings of other research studies. The sample of 50 student participants and nine teacher participants is a small sample size and can make only a limited contribution to this field. Nevertheless, the findings indicated that TEL has a positive impact on the learning experience of EAL learners and offers suggestions as to why this may be the case. Pairing quantitative

data with qualitative data improved reliability. With multi-sited research and a larger sample size this could be further enhanced.

As mentioned previously, EAL learners do not form a homogenous group. EAL learners come from a wide variety of backgrounds and differ vastly in their linguistic ability. Statistical categories of EAL that offer further sub-dimensions, such as their level of education before arriving in the UK, the types of learning environment they have previously experienced, their language background and practise in country of origin and socioeconomic status indicators such as free school meals, were not developed in this study. This would have been too broad, challenging and costly. Furthermore, no reliable data existed. The large number of EAL learners arriving in UK schools, annually, from diverse, multilingual backgrounds rendered it difficult to include a more detailed, disaggregated profile of EAL learners on these aspects. Within the selected population for this study, learners with special educational needs (SEN) were excluded. Analysing the needs of EAL participants and the factors affecting their learning and attainment levels requires expertise. It would be even more challenging to explore, within this cohort, the needs of SEN EAL learners and the impact of TEL on their learning experience in the Faith Valley School context.

Every attempt was made to gather data relevant to the current study and the focus of this study was to be responsive to three specific research questions through data and method triangulation. Nevertheless, researcher bias is always present, especially in qualitative research (see Chapter Three). For instance, in this study, focus group discussions made it necessary to direct the conversation to specific questions. However, participant validation and triangulation did contribute to minimising research bias. Despite the lack of broader generalisability of the results and the small sample size, the limitations presented in this research offer incentives for future research to be conducted.

6.8 Recommendations for professional practice

6.8.1 TEL practice for EAL learners

This research suggests that how (or how well) TEL is used is the important consideration, rather than the choice of a particular TEL resource. From the research study, it is clear that the rationale for the impact of TEL on teaching and learning needs

to be clear in terms of its pedagogical and skill requirements and students' learning needs, right at the outset of its application. It is recommended that, with the adoption and use of TEL in EAL teaching and learning, specific basic questions should be considered. These include: Will learners work more efficiently, more effectively, more intensively? Will TEL help learners to learn for longer, in more depth, more productively? Will the teacher be able to support learners more efficiently or more effectively? The role of TEL in learning should also be identified. This is specifically to ascertain whether it will help learners gain access to the curriculum, to teachers or to peers, to feedback and independent learning and to engage with learning outcomes. However TEL is adopted, it should support collaboration and effective interaction for learning. This is because the use of TEL is usually more productive when it supports collaboration and interaction, particularly collaborative use by learners or when teachers use it to support discussion, interaction and feedback. It is, therefore, necessary to critically examine the repercussions of what learners and teachers will stop doing, in terms of traditional teaching/learning practice, and to ensure that technology is not introduced in a vacuum. Hence, it is important to identify what TEL will replace and how TEL activities can add to EAL students' learning experience.

6.8.2 Strategic use of TEL to support EAL learners in the study of mathematics, English and MFL

Strategic use of TEL can be used to support EAL learners in mathematics. According to Dick and Hollebrands (2011), it strengthens mathematics teaching and learning. Teachers can strategically use TEL in the teaching and learning of mathematics. This must entail the use of digital and physical tools in thoughtfully designed ways and at carefully determined times so that the capabilities of TEL enhance how learners and teachers engage with and communicate mathematical concepts. The use of TEL tools must be determined through decision-making that keeps mathematics, and not TEL, the focus of learning. For instance, strategic use should be applicable to both content-specific and content-neutral TEL resources in both synchronous and asynchronous settings. Content-specific mathematics technologies could include computer algebra systems, dynamic geometry environments, interactive applets, handheld computation, data collection, analysis devices and computer-based applications. Content-neutral technologies could include communication and collaboration tools, adaptive technologies, and web-based digital media. Used strategically, content-specific

mathematics technologies have the potential to support learners in exploring and identifying mathematical concepts and relationships. Effectively applied content-neutral technologies have the ability to increase learners' access to information and ideas and to enhance learner-to-learner and learner-to-teacher interactions to support and enrich understanding. Strategic use of TEL can support the learning of mathematical procedures and skills as well as the development of advanced mathematical proficiencies, such as problem-solving, reasoning and justifying (Gadanidis and Geiger, 2010; Kastberg, and Leatham, 2005; Nelson et al., 2009; Pierce and Stacey, 2010; Roschelle et al., 2010; Suh and Moyer, 2007).

In supporting EAL learners in the learning of English, a method that teachers can adopt and use effectively is TEL in the form of multimedia technology in order to flexibly create 'authentic' English language learning contexts. This has the potential to assist learners to get involved and learn according to their interests. As a tried and tested approach which is widely accepted for teaching English in contemporary times, TEL use in the form of multimedia helps learners to keep pace and gain more confidence and mastery in the study of English (Roschelle et al., 2010). Another area where TEL can be used in language learning and which is known to be effective is its incorporation in project work. Teachers may encourage learners to learn about things through language. Getting learners to do work about topics that are of interest to them, or topics that are taught in other parts of the curriculum (e.g. CLIL) aids the development and learning of English and improves their language skills (Duke & Pearson, 2008). Teachers can encourage learners to go online to read or listen to material about different areas of interest; they can then write or speak about what they have discovered, telling others in the class or other classes elsewhere. The use of films can further be adopted as an effective medium for teaching English language skills, and as a way to motivate learners to learn English. For instance, Collins et al., (2002) suggest that by watching and listening to engrossing materials, students are greatly motivated to learn English. It has also been pointed out that this method further enhances learners' listening comprehension and pronunciation skills (Collins et al., 2002).

TEL and its tools, such as CD-ROM discs, interactive audio and video discs, local area networks, hypermedia and telecommunications, can strengthen EAL learners' language development in speaking, reading and writing (Soska, 1994). Databases and spreadsheets can furnish direct experience in organising and retrieving information, as

well as developing problem-solving skills. Word processors, mobile technology and internet sources such as Google Translate are useful multilingual resources to support and motivate EAL learners to develop their writing practice in English.

In teaching MFL lessons, secondary school teachers can adopt different forms of technology-based language learning (TBLL) resources to assist learners in gaining competencies in the study of MFL. Such TBLL resources may take the form of computer-assisted language learning (CALL), mobile-assisted language learning (MALL), internet-based language learning (IBLL), online language learning (OLL), Google-assisted language learning (GALL) or technology enhanced language learning (TELL). Teachers should encourage and guide learners to adopt them in their study of MFL. Technologies and applications are hugely successful in allowing learners to learn independently or collaboratively through the media: from listening to language files and watching YouTube videos to using specific language-instruction software. Learners could be encouraged to practise and gain confidence and proficiency using the tools mentioned above, which will serve as cornerstones in learning a foreign language (Saqlain, 2012). Internet-based language-learning provides learners with opportunities to practise with confidence (Saqlain, 2012). Learners can use Skype, chat, and instant messengers, including Google Talk, to improve their speaking and comprehension skills by talking with first language speakers of the language they are learning. Similarly, Twitter and Facebook can be helpful in learning a foreign language (Saqlain, 2012).

Capacity building in the strategic use of TEL practice in the three mentioned subjects could be developed to enhance teaching and learning practice consistently for EAL learners. This could then be further explored through action research and shared, as good practice, in schools across the Borough of Islington.

6.8.3 Capacity building

This study suggests that teachers have an important role in TEL environments and require well-developed instructional skills and pedagogical approaches. It corroborates with past research reports (Glisan et al., 1998; Kern, 1996; MGrath, 1998; Weiss, 1994), which indicate that the role of a teacher as facilitator is important in technology enhanced learning environments. The issue of teacher facilitation must also be addressed in such environments. Although learners in this study rated teacher

interaction favourably, negative perceptions about the learning value of the instructional components may imply that teacher facilitation was still insufficient. This may be especially true for low ability students, who need increased assistance (Lee, 1993) and for students with little prior background in English as an additional language (Young, 1986).

It is recommended that teachers and learners should be supported in developing their use of TEL to ensure that it improves the learning experience of EAL students. On-going professional development and support to evaluate the impact on learning should be offered to teachers, as it is likely to be required. From the research study and the review of literature, training for teachers (and for learners), when it is offered, usually focuses on TEL skills in terms of using the equipment. This is not usually sufficient to support teachers and learners in getting the best from TEL in terms of their teaching and learning practice (Higgins 2012).

Teachers working in learning environments mediated by TEL need support and preparation to adopt new roles. Paul (1990) explains that there is frequently role confusion and ambivalence among teachers working with learners using technology, noting that there is internal conflict between the notion of creating an independent learner and a teacher's natural sense of responsibility. Professional development must include those skills and practices necessary for the teacher to be and become a facilitator and co-learner, rather than an information transmitter. The development of professional practice must also include new pedagogical as well as technical and routine management skills. In addition to this Glisan et al. (1998), previously mentioned that with facilitative teaching skills teachers must learn to negotiate meaning with learners in an unpredictable learning environment where any question may be asked at any moment. Such unpredictability precludes the extensive preparation, and resulting customary security, of a structured lesson in a regular classroom. Teachers must learn to encourage EAL learners (and themselves) to engage in a holistic, rather than linear, learning process, thus allowing learners to ask questions 'out of order', and answering such questions in a way that encourages elaboration. They should learn to create opportunities for increased person-to-person interaction within a learning environment and, at the same time, manage these interactions and keep them task-focused. Issues dealing with the design of the curriculum, to make it more inclusive, must also be addressed. Some differentiated structured activities and scaffolding

activities that activate background knowledge could be carefully integrated within a holistic curriculum to enable every EAL learner to negotiate the learning environment in an accessible manner at their own pace. Paul (1990) draws attention to the conflict that exists between structured, mastery-based learning that dissuades the development of the independent learner and the challenging environments that enable students to take responsibility for their own learning. This tension must be considered in making curricular design decisions for TEL to facilitate EAL students' learning. Additionally, the pace of curriculum delivery must be evaluated to accommodate time constraints and feelings of student control, especially for struggling and stage one EAL learners (Cummins, 2000).

A framework to assist teachers to share good practice could be developed, possibly, called 'teachers helping teachers: peer observations'. This could comprise a pre-determined lesson observation schedule, a peer-observer form, and peer-observer guidance notes. The aim would be to encourage teachers using TEL strategies, consistently in a planned and structured manner in their teaching and learning practice, to share good practice with each other. This may enable them to feel comfortable with practice as they glean ideas from each other on developing their TEL based working practice across different subject areas. Observations could be designed to share constructive feedback enabling co-learning as observers may see new techniques in action, while getting new ideas and resources to inform their teaching, and allow them to reflect on their own assumptions, beliefs, and teaching practices in their subject area. Based on their discussions and reflections, participants can develop action plans or action research projects to improve their TEL practice for the benefit of EAL learners. Peer observations can also improve camaraderie, deepen collaboration, and increase self-awareness among participating teachers (ref).

6.9 Recommendations for future research

This study did not concern itself with the issue of teacher training in EAL. Teacher education has been fiercely debated among several researchers, with suggestions that teacher training be scrutinised and strategies developed to ensure all teachers possess the skills to teach EAL learners (De Oliveira and Silva, 2013). Teacher training, with a specific focus on TEL for supporting EAL learners, could be examined in future studies on a larger scale. The study established that teachers who had sound

instructional and TEL skills made a significant impact and contribution to the learning of EAL learners in the three subjects explored. This could be further developed through more large-scale action research to provide more tangible and constructive research-informed suggestions for teacher training programmes.

The study could have engaged in a comparative study involving diverse first language English learners in the school and their EAL peers. Progress and test scores of these all categories of learners could then have been compared to broaden the findings, making them more robust and thus a base for stronger claims with more in-depth insight. Further research could also involve a multi-sited comparative study between different schools in order to expand the sample size and strengthen generalisation of research findings. For instance, this may involve several boys' single-sex schools, girls' single-sex schools, or co-ed secondary or primary-schools in different locations.

Additionally, the study could have probed more into EAL learners' motivations and autonomy in learning/independent learning to ascertain whether the use of TEL in the study of the three subjects had influence or could encourage them to develop independent learning skills.

Finally, the study has not located itself in action research, but has embraced the pragmatic paradigm, making use of the explanatory, sequential, mixed method research design for the simple reason that action learning and action research benefit from a participatory research approach which could be further developed beyond the context of this study.

6.10 Chapter summary

Overall, the research evidence over the last couple of years about the impact of TEL on learning consistently identifies positive benefits. The use of TEL to improve EAL learners' attainment suggests the positive association between TEL and educational outcomes. However, there are limitations to making generalisations beyond the context of Faith Valley School. It seems probable that more effective schools and teachers are more likely to use TEL more effectively. There is a need to further research how TEL is used in a variety of learning environments. Research findings from the study suggest that the consistent and structured use of TEL has a positive impact on EAL students' learning. The range of impact identified in this study seems to suggest that it is not

whether TEL is used which makes the difference, but how well TEL is used to support EAL students' learning experience. There is no doubt that TEL engages and motivates EAL learners. However, this benefit is an advantage for learning only if the activity is effectively aligned with what is to be learned. It is, therefore, the pedagogy of the application of TEL in the classroom which is important: the how rather than the what.

Taken together, research evidence does offer a convincing case for the general impact of TEL on EAL students' learning outcomes. Even so, researchers should be cautious in the face of technological solutions to educational challenges. Careful thought is needed to use TEL to best effect. The challenge is to ensure that TEL is used to enable, or make more efficient, enriching and facilitating teaching and learning practices.

Evidence from the study suggests that the capacity building of teachers in the use of TEL to deliver subject content to EAL learners goes a long way to ensure its successful implementation and good study outcomes. The implication is that such support should go beyond the teaching of skills in TEL and focus on the successful pedagogical use of TEL to support teaching and learning practice, with a specific focus on improving the attainment of EAL learners.

The over-arching implication is that TEL is a catalyst rather than a cause of change. This raises the question of how TEL can bring about improvement and make teaching and learning practices more centred on the diverse learning identities and needs of EAL students. Focusing on the change (and the process of change) in terms of learning is essential in supporting effective use of TEL for EAL learners.

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APPENDICES

Appendix A Stages of English language development and evaluative test results

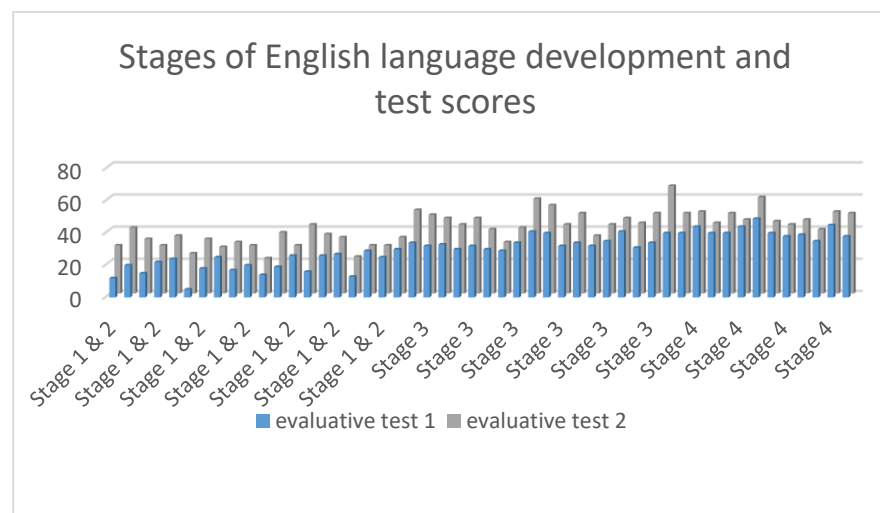


Figure 4.4. Stages of English language development and evaluative test results

Appendix B - Learners' Evaluative Test 1 and Evaluative Test 2

Appendix B1: Modern Foreign Languages

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	30	52	50	57
Learner 2	45	51	60	51
Learner 3	15	67	43	60
Learner 4	23	50	34	51
Learner 5	45	69	55	70
Learner 6	56	63	60	61
Learner 7	41	55	47	59
Learner 8	34	48	40	50
Learner 9	59	71	70	72
Learner 10	46	51	55	50
Learner 11	45	56	78	60
Learner 12	60	69	62	70
Learner 13	43	55	56	59
Learner 14	38	72	40	79
Learner 15	13	60	45	67
Learner 16	45	57	50	50

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 17	49	55	52	60
Learner 18	60	73	61	80
Learner 19	23	50	43	52
Learner 20	35	49	46	50
Learner 21	29	70	45	73
Learner 22	35	56	50	57
Learner 23	65	66	66	60
Learner 24	22	34	40	40
Learner 25	40	51	45	55
Learner 26	37	56	48	56
Learner 27	55	60	59	60
Learner 28	49	49	52	51
Learner 29	50	56	60	57
Learner 30	51	60	54	58
Learner 31	12	50	24	54
Learner 32	38	57	46	60
Learner 33	34	56	44	55
Learner 34	51	78	58	76

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 35	20	51	39	55
Learner 36	15	56	23	60
Learner 37	33	65	45	69
Learner 38	45	55	57	60
Learner 39	39	76	42	80
Learner 40	48	59	55	61
Learner 41	55	79	55	73
Learner 42	54	69	56	70
Learner 43	61	66	61	57
Learner 44	34	45	45	48
Learner 45	22	39	30	46
Learner 46	45	56	45	50
Learner 47	32	46	45	50
Learner 48	37	50	40	55
Learner 49	41	61	46	67
Learner 50	50	52	60	56

Appendix B2: Mathematics

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	56	50	66	52
Learner 2	67	40	72	48
Learner 3	45	50	50	61
Learner 4	50	44	55	34
Learner 5	56	35	72	50
Learner 6	70	56	77	55
Learner 7	45	59	56	50
Learner 8	34	56	50	61
Learner 9	56	34	63	48
Learner 10	81	28	87	44
Learner 11	57	55	61	34
Learner 12	66	45	74	50
Learner 13	34	67	50	54
Learner 14	51	89	65	78
Learner 15	60	54	71	58
Learner 16	61	62	65	71
Learner 17	77	34	90	40

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 18	45	76	62	70
Learner 19	56	46	58	54
Learner 20	23	34	49	50
Learner 21	44	19	64	34
Learner 22	67	52	82	55
Learner 23	44	34	50	47
Learner 24	64	61	72	60
Learner 25	34	75	47	67
Learner 26	12	45	34	59
Learner 27	47	63	55	55
Learner 28	34	33	50	45
Learner 29	56	26	62	36
Learner 30	45	56	54	58
Learner 31	56	71	60	79
Learner 32	25	39	40	45
Learner 33	67	45	70	55
Learner 34	56	51	70	50
Learner 35	19	56	34	53

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 36	66	34	72	45
Learner 37	53	57	59	60
Learner 38	49	63	60	60
Learner 39	55	45	59	50
Learner 40	60	52	70	50
Learner 41	66	61	70	55
Learner 42	78	66	81	67
Learner 43	70	47	77	48
Learner 44	57	51	60	49
Learner 45	39	44	42	53
Learner 46	55	67	59	65
Learner 47	45	52	56	60
Learner 48	70	55	60	58
Learner 49	54	57	55	56
Learner 50	60	62	71	67

Appendix B3: English

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	12	61	30	63
Learner 2	20	50	41	52
Learner 3	15	77	34	70
Learner 4	30	52	35	51
Learner 5	22	49	30	60
Learner 6	40	55	50	58
Learner 7	34	63	52	71
Learner 8	24	50	36	66
Learner 9	44	62	51	63
Learner 10	32	61	49	59
Learner 11	5	45	25	67
Learner 12	18	50	34	60
Learner 13	33	49	47	55
Learner 14	25	60	29	65
Learner 15	30	55	43	69
Learner 16	17	53	32	70
Learner 17	40	60	44	65

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 18	20	56	30	59
Learner 19	14	73	22	70
Learner 20	40	49	50	55
Learner 21	19	56	38	60
Learner 22	32	67	47	76
Learner 23	26	62	30	75
Learner 24	30	55	40	60
Learner 25	29	51	32	54
Learner 26	44	60	46	62
Learner 27	49	34	60	50
Learner 28	34	56	41	60
Learner 29	41	77	59	80
Learner 30	45	56	55	62
Learner 31	16	49	43	50
Learner 32	32	66	43	63
Learner 33	26	72	37	75
Learner 34	40	77	45	76
Learner 35	34	62	50	59

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 36	27	45	35	50
Learner 37	13	57	23	59
Learner 38	32	54	36	60
Learner 39	29	80	30	78
Learner 40	35	48	43	59
Learner 41	45	65	47	66
Learner 42	31	55	44	71
Learner 43	38	70	43	75
Learner 44	39	48	46	50
Learner 45	35	56	40	57
Learner 46	34	60	50	66
Learner 47	25	65	30	71
Learner 48	45	61	51	64
Learner 49	38	50	50	57
Learner 50	40	62	67	69

Appendix C – Research Tools

Appendix C1: Pilot Study - Learner Questionnaire

Dear Learner,

This questionnaire is to help us to find out from you how Technology Enhanced Learning (TEL) may have helped or may be helping you improve your learning and grades in English, Mathematics and modern foreign languages.

The information you give in this questionnaire will be used for the purpose of a research study. Information about you will not be given to anyone (the school, teachers or people outside the school). Information that you give will remain confidential (your identity will be kept secret/anonymous). Please answer the questions freely and tell us what you think. We are interested in learning from the things you have to say.

Thank you

M. Acquah

Section A: General Information

Age:

Year Group:

Length of time you have lived in England:

Nationality:

Languages you speak:

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Is TEL used in your lessons? (Please Tick)

YES

NO

In which lessons is TEL used? (Please Tick)

Mathematics

English

Science

MFL (modern foreign languages)

Others (Specify).....

3. What types of TEL are used in your lessons? (Please Tick)

Interactive whiteboards

Overhead projectors

Computers

Internet

Web based teaching and learning resources

Camcorders/Digital Cameras

Scanners

Printers

Others (Specify)_____

How is TEL used in lessons? (Please Tick)

In explaining work/tasks

In explaining ideas/concepts

For class work/tasks

As extra learning practice for what has been taught

For homework tasks

Other (Specify) _____

5. Do you like the idea of TEL being used in your lessons? (Please Tick)

YES

NO

Section C: Impact of Technology Enhanced Learning (TEL)

6. Has the use of TEL helped improve your grades in Mathematics? (Please Tick)

YES

NO

7. How has it helped? (Please Tick)

To understand what is taught

Made lessons more interesting

Made Mathematics more practical

I am able to work on my own using Mathematics study sites

Do more Mathematics homework

Other (Specify) _____

8. Has the use of TEL helped you get good grades in English? (Please Tick)

YES

NO

9. How has it helped? (Please Tick)

To understand what is taught

Made lesson more interesting

Made English more practical

Helped me do more English homework

To work on my own using English study sites

Other (Specify) _____

10. Has the use of TEL helped you get good grades in modern foreign languages?
(Please Tick)

YES NO

11. How has it helped? (Please Tick)

To understand what is taught

Made lesson more interesting

Made MFL more practical

Work on my own using MFL study sites

Other (Specify) _____

Section D: Impact of Technology Enhanced Learning on Curriculum Delivery

12. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) helped you understand your subject better? (Please Tick)

YES NO

13. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) made your homework easier? (Please Tick)

YES NO

14. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) resources made your exams easier? (Please Tick).

YES NO

Section E: Technology Enhanced Learning and Independent Learning

15. Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) help you study on your own? (Please Tick).

YES NO

Does the use of TEL learning resources help you study better? (Please Tick)

YES NO

Does the use of TEL learning resources help you study longer? (Please Tick)

YES NO

Has the use of TEL made you more confident in studying on your own? (Please Tick)

YES NO

Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) assist you to do homework without help? (Please Tick)

YES NO

Section F: Technology Enhanced Learning and Specific Subject Objectives

Has the use of TEL helped you to improve your reading? (Please Tick)

YES NO NOT SURE

Has the use of TEL helped you to improve your language learning? (Please Tick)

YES NO NOT SURE

Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better? (Please Tick)

YES NO NOT SURE

Has the use of TEL strategies helped to improve your mathematical skills and ability? (Please Tick)

YES NO NOT SURE

Has the use of TEL helped you to make progress and improvements in your learning? (Please Tick)

YES NO NOT SURE

Has the use of TEL helped you to gain good exam results? (Please Tick)

YES NO NOT SURE

Has the use of TEL helped you to get good grades in English? (Please Tick)

YES NO NOT SURE

Has the use of TEL made you want to study more? (Please Tick)

YES NO NOT SURE

Does the use of TEL make you more interested in learning? (Please Tick)

YES NO NOT SURE

How long can you learn using web based or online resources? (Please Tick)

30 mins – 1 hour 2) 1 hour 30 mins – 2 hours 3) 3 - 4 hours 4) Other
(Specify).....

Section G: Technology Enhanced Learning and other subjects

Are you able to apply TEL skills you have developed in other subject areas? (Please Tick)

YES (If Yes go to 31) NO (If No go to 32)

How are you able to use TEL in other subjects?

(Please give details and examples)

Do you think it is difficult for you to use TEL skills gained in other subject areas? (Please Tick)

YES NO

(If YES Please give reasons)

Thank you for taking the time to answer these questions.

Appendix C2: Pilot Study - Teacher Questionnaire

Dear colleague,

This questionnaire aims to find out how you incorporate Technology Enhanced Learning (TEL) in your teaching practice. The questionnaire invites you to share insights on whether or not it is helping you to improve your teaching. It further aims to help assess whether EAL learners in your subject benefit from the use of TEL in teaching.

Information that you provide in this questionnaire will be used strictly for the purpose of academic research and not disclosed to any other person or institution (including in the school, other teachers or external agencies). All findings will be shared with you. Confidentiality regarding your identity will be maintained throughout. I would be grateful for your time to respond to the questions in the accompanying questionnaire.

Thank you

M. Acquah

Section A:

Subject Taught

English

Mathematics

modern foreign languages

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Do you use TEL in your lessons?

YES

NO

What types of TEL do you use in your lessons? (Please Tick)

Interactive whiteboards

Overhead projectors

Computers

Internet

Web based teaching and learning resources

Camcorders/Digital Cameras

Scanners

Printers

Others (Specify)

3. How do you use TEL in your lessons? (Please Tick)

For explaining work/tasks

For explaining concepts

For class work/tasks

For extension activities for what has been taught/practice

For homework tasks

Other (Specify) _____

4. Has the use of TEL in teaching helped improve your learners' grades in the subject?

(Please Tick) YES

NO

NOT SURE

If yes, please proceed to question 5

5. How has it helped?

To understand what is taught

Made lessons more interesting

Made teaching the subject easier

Made the subject more practical

Made EAL learners independent learners

Helped EAL learners complete more homework tasks

Helped EAL learners to improve their grades

Improved EAL learners attention span

Made learners engage more in lessons

Other (Specify) _____

6. Has the use of TEL strategies helped improve your instructional skills? (Please Tick)

YES NO NOT SURE

7. Has the use of TEL helped EAL learners gain good exam results in your subject?

(Please Tick) YES NO NOT SURE

8. Do you have challenges using TEL to teach your lessons? (Please Tick) YES

NO NOT SURE

9. Does lesson preparation incorporating TEL take more time than lessons without

TEL? YES NO NOT SURE

10. Would you readily use TEL in teaching EAL learners? (Please Tick) YES

NO NOT SURE

Thank you for taking the time to answer these questions.

Appendix C3: Pilot Study – Focus Group Discussion Probes

This semi-structured focus group discussion tool aims to gain more information about how the use of TEL is influencing teaching and learning. This is to develop an enhanced understanding of the experiences of teachers using TEL in lessons.

General

- What technologies are currently being used by teachers in the school?
- Where do teachers generally use TEL resources for their teaching?
- How many minutes in a lesson do teachers use TEL e.g. using computers for their teaching activities?
- What types of Career Development Programmes (CDP) have teachers had to help them incorporate TEL in teaching?
- What type of TEL related support do teachers have in the school?
- What is the stage that best describes the level for teachers in terms of their TEL integration in lessons?

Specific

- How are you intending to incorporate TEL in your lessons?
- Has your CDP covered training to help support your use of TEL in the class?
- Do you use TEL in your lessons?
- Do you use TEL in teaching EAL learners?
- Do you think TEL makes a difference in teaching EAL learners?
- How confident are you in the use of TEL in teaching?
- What outcomes are you expecting to achieve using TEL to teach EAL learners?
- What test results are you expecting?
- Do you have the skills to use TEL in teaching?

Appendix C4: Pilot Study - Observation Schedule

Proposed Lesson Observation Schedule			
Class:	No of learners:	Date:	Teacher:
Curricular area:	Time:	Duration:	Observer:

Teaching approaches	Observation/Ticks
<ul style="list-style-type: none"> ▪ The lesson is guided by expected learning outcomes which are linked to the curriculum and TEL? ▪ The lesson is well structured (introduction, development, conclusion-review) and use of TEL well defined? ▪ A range of teaching approaches is used: <p>Teacher and pupil questioning</p> <p>Active learning including use of TEL</p> <p>Guided activity and discovery</p> <p>Co-operative/collaborative learning</p> <p>Talk and discussion</p> <p>On-line based learning</p> <p>Order thinking and problem solving</p> <ul style="list-style-type: none"> ▪ Necessary and relevant resources including TEL by teacher and/or learners are used to support learners' learning <p>Use of TEL</p> <p>To explain tasks</p>	

For class work sheets

Extension activities for what has been taught

- The varying needs and abilities of learners (Proficiency of use of TEL) are catered for through the use of differentiation
- Teacher's demonstration of the use of TEL is clear, includes guidance on how low ability learners can learn using TEL.
- Effective use is made of opportunities to develop TEL skills.

Online tasks

Other Activity-state

- Attention is given to the consolidation of learners' learning
- Constructive feedback is provided to learners on their learning and use of TEL and teaching and learning is amended in the light of that feedback

Learners' engagement in learning

- Learners work purposefully using TEL during the lesson

Answering questions

Learners are provided with TEL avenues to engage in online structured work.

- Learners are interested in the lesson content

Inter learner discussions and group activities using

TEL

- All learners participate in the lesson
- Learners are properly challenged in their learning
- There is progression in the learners' learning and opportunities for TEL extension tasks
- Learners achieve the expected TEL outcome(s) of the lesson

		Tick every instance in each category
Number of positive statements about:		
	Performance	
	Use of TEL	
	Effort	
	Behaviour	
Number of corrective statements about:		
	Performance	
	Use of TEL	
	Effort	
	Behaviour	
	Other events contributing to positive climate	
Number of times/reasons learners called in for:		
	Performance (e.g. further demonstrations of the use of TEL, information)	
	Effort (e.g. lack of effort, to motivate to further effort)	
	Behaviour (e.g. to remind about behaviour or rules)	
Other aspects of lesson climate.		
List below:		

Learners names used	Frequently	Sometimes	Rarely
(tick one)			

Appendix C5: Main Study - Learner Questionnaire

Dear Learner,

This questionnaire is to help us to find out from you how Technology Enhanced Learning (TEL) may have helped or may be helping you improve your learning and grades in English, mathematics and modern foreign languages.

The information you give in this questionnaire will be used for the purpose of a research study. Information about you will not be given to anyone (the school, teachers or people outside the school). Information that you give will remain confidential (your identity will be kept secret/anonymous). Please answer the questions freely and tell us what you think. We are interested in learning from the things you have to say.

Thank you

M. Acquah

Section A: General Information

Age:

Year Group:

Length of time you have lived in England:

Nationality:

Languages you speak:

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Is TEL used in your lessons? (Please Tick)

- YES
- NO

In which lessons is TEL used? (Please Tick)

- Mathematics
- English
- Science

- To understand what is taught
- Made lesson more interesting
- Made English more practical
- Helped me do more English homework
- To work on my own using English study sites
- Other (Specify) _____

10. Has the use of TEL helped you get good grades in modern foreign languages?

(Please Tick)

- YES NO

11. How has it helped? (Please Tick)

- To understand what is taught
- Made lesson more interesting
- Made MFL more practical
- Work on my own using MFL study sites
- Other (Specify) _____

Section D: Impact of Technology Enhanced Learning on Curriculum Delivery

12. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) helped you understand your subject better? (Please Tick)

- YES NO

13. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) made your homework easier? (Please Tick)

- YES NO

14. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) resources made your exams easier? (Please Tick).

- YES NO

Section E: Technology Enhanced Learning and Independent Learning

15. Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) help you study on your own? (Please Tick).

- YES NO

16. Does the use of TEL learning resources help you study better? (Please Tick)

- YES NO

17. Does the use of TEL learning resources help you study longer? (Please Tick)

- YES NO

18. Has the use of TEL made you more confident in studying on your own? (Please Tick)

- YES NO

19. Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) assist you to do homework without help? (Please Tick)

- YES NO

Section F: Technology Enhanced Learning and Specific Subject Objectives

20. Has the use of TEL helped you to improve your reading? (Please Tick)

- YES NO NOT SURE

21. Has the use of TEL helped you to improve your language learning? (Please Tick)

- YES NO NOT SURE

22. Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better? (Please Tick)

- YES NO NOT SURE

23. Has the use of TEL strategies helped to improve your mathematical skills and ability? (Please Tick)

- YES NO NOT SURE

24. Has the use of TEL helped you to make progress and improvements in your learning?

(Please Tick)

- YES NO NOT SURE

25. Has the use of TEL helped you to gain good exam results? (Please Tick)

- YES NO NOT SURE

26. Has the use of TEL helped you to get good grades in English? (Please Tick)

- YES NO NOT SURE

27. Has the use of TEL made you want to study more? (Please Tick)

- YES NO NOT SURE

28. Does the use of TEL make you more interested in learning? (Please Tick)

- YES NO NOT SURE

29. How long can you learn using web based or online resources? (Please Tick)

- 30 mins – 1 hour 2) 1 hour 30 mins – 2 hours 3) 3 - 4 hours
4) Other (Specify).....

Section G: Technology Enhanced Learning and other subjects

30. Are you able to apply TEL skills you have developed in other subject areas?
(Please Tick)

- YES (If Yes go to 31) NO (If No go to 32)

31. How are you able to use TEL in other subjects?

- (Please give details and examples)

Thank you for taking the time to answer these questions.

Appendix C6: Main Study - Teacher Questionnaire

Dear colleague,

This questionnaire aims to find out how you incorporate Technology Enhanced Learning (TEL) in your teaching practice. The questionnaire invites you to share insights on whether or not it is helping you to improve your teaching. It further aims to help assess whether EAL learners in your subject benefit from the use of TEL in teaching.

Information that you provide in this questionnaire will be used strictly for the purpose of academic research and not disclosed to any other person or institution (including in the school, other teachers or external agencies). All findings will be shared with you. Confidentiality regarding your identity will be maintained throughout. I would be grateful for your time to respond to the questions in the accompanying questionnaire.

Thank you

M. Acquah

Section A:

Subject Taught

- English Mathematics modern foreign languages

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Do you use TEL in your lessons?

- YES NO

What types of TEL do you use in your lessons? (Please Tick)

- Interactive whiteboards
- Overhead projectors
- Computers

7. Has the use of TEL helped EAL learners gain good exam results in your subject?
(Please Tick)

- YES NO NOT SURE

8. Do you have challenges using TEL to teach your lessons? (Please Tick)

- YES NO NOT SURE

9. Does lesson preparation incorporating TEL take more time than lessons without TEL?

- YES NO NOT SURE

10. Would you readily use TEL in teaching EAL learners? (Please Tick)

- YES NO NOT SURE

Thank you for taking the time to answer these questions.

Appendix C7: Main Study - Focus Group Discussion 1

This focus group discussion probe tool aims to gain more information about how the use of TEL is influencing teaching and learning. This is an exploratory discussion to develop an enhanced understanding of the experiences of teachers using TEL in a structured and consistent manner in lessons.

General Probes

1. What technologies are currently being used by teachers in the school?
2. Where do teachers generally use TEL resources for their teaching?
3. What is the average number of minutes teachers use TEL in lessons e.g. using computers for their teaching activities?
4. What types of Career Development Programmes (CDP) have teachers had to help them incorporate TEL in teaching?
5. What type of TEL related support do teachers have in the school?
6. What is the stage (Basic, emerging, standard, and advanced) that best describes the level of TEL usage competence for teachers in terms of TEL integration in lessons?

Specific Probes

7. How are you intending to incorporate TEL in your lessons?
8. Has your CDP covered training to help support your use of TEL in the class?
9. Do you use TEL in your lessons?
10. Do you use TEL in teaching EAL learners?
11. Do you think using TEL consistently in a structured way makes a difference in teaching EAL learners?
12. How confident are you in the use of TEL in teaching?
13. What outcomes are you expecting to achieve using TEL in a structured way to teach EAL learners?

Appendix C8: Main Study - Focus Group Discussion 2

Focus Group Discussion 2

The expectation of this focus group discussion is to provide a clear picture of how the use of TEL may have influenced teaching and learning in significant ways. It seeks to compile the experiences of teachers using TEL in teaching and learning.

1. How did you incorporate TEL in your teaching of EAL learners?
2. How many minutes or hours per week did learners use TEL?
3. How confident are you now in the use of TEL in teaching?
4. How did EAL learners respond to the use of TEL in teaching?
5. Did EAL learners make progress when structured consistent TEL strategies were used?
6. How easy or difficult was it to adopt structured consistent TEL strategies to teach EAL learners?
7. How effective was the use of TEL strategies?
8. Have you received any training for the use of TEL since you started using TEL to teach?
9. If no, would you have wanted training?

Specific Probes

10. What types of TEL related training and support did you receive in school during the research study's implementation?
11. What type of progress have learners in your lessons made so far?
12. How do you measure the progress made by learners?
13. Did the use of structured and consistent use of TEL change learners approach to learning?
14. Did the use of structured and consistent TEL change your approach to teaching?
15. Did the use of structured and consistent TEL change the way learners were supported in lessons and in the subject?
16. Did the use of structured and consistent TEL improve your learners' grades in the subject?
17. Did the use of TEL have an impact on learners' motivation, attainment, attitude, engagement and approach to learning?
18. How do you evaluate the integration of TEL level in your teaching practice?
19. Were your expected outcomes realised?
20. To what extent were they realised?

Appendix C9: Main Study - Observation Schedule

Teaching and Learning Observation Schedule - English

The following particular classroom activities are the focal point of the observations

- Physical equipment: Usage of TEL equipment,
- TEL Strategies: Types of TEL strategies used by learners and teachers
- Organisational frames: class size, composition of class (learners are of mixed abilities or streamed according to capability)

Setting the scene:

- Introduction of lesson focusing on objectives
- how are the objectives framed (do they have all the four requirements)
- At what level are learners in (Cognitive levels – Bloom)
- Does the teacher communicate the objectives to learners
- How well are the objectives explained to learners

Interaction in the classroom: defined in terms of the role played by both teacher and learners in the lesson.

How is participation distributed among the classroom members?

- patterns of unequal participation may follow lines of teacher domination
- teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer)
- learners talk – in response to teacher's question or they can initiate it
- learners communicate with each other
- learners are given opportunity to work by themselves

What characterise classroom talk i.e. how is knowledge constructed and shared in the classroom?

- Disputational
- Cumulative
- Exploratory

What kind of speech acts do learners perform do they:

- Assert
- Challenge

- explain or
- respond to teacher's question

What is the nature of reasoning that is encouraged in the classroom?

Assessment strategies or tools

- What is the purpose for assessing in the lessons
- Does the teacher clarify the nature of the assessment criteria to learners?
- What is the nature of the assessment tasks used by teachers?
- The relationship between the chosen assessment task and the specific objectives
- What forms of assessment strategies do teachers engage with and how are they used?

Feedback

- Does the teacher praise or encourages learners
- How is feedback communicated to learners?
- Does it provide the learners a realistic picture of their progress?
- Does it provide learners a sense of how to improve?

Remedial activities

- How is remediation planned?
- Are slow learners given 'corrective' attention or additional assistance?
- How is remediation conducted?

Enrichment activities

- How is enrichment planned?
- Are the 'masters' given constructive extra work?
- How is enrichment conducted?

Observational Ticks and Tallies			
Class:	No of learners:	Date:	Teacher:
Curricular area:	Time:	Duration:	Observer:

Composition of class: learners are of mixed abilities or streamed according to capability

Setting the scene: <ul style="list-style-type: none"> • Introduction of lesson focusing on objectives • how are the objectives framed (do they have all the four 	Observation/Ticks (tick when action is observed)
--	--

<p>requirements)</p> <ul style="list-style-type: none"> • At what level are learners in (Cognitive levels – Bloom)? <ul style="list-style-type: none"> ○ Knowledge ○ Comprehension ○ Application ○ Analysis ○ Synthesis • Does the teacher communicate the objectives to learners • How well are the objectives explained to learners <ul style="list-style-type: none"> ○ Poor ○ Partially well ○ Very well 	
<p>Physical equipment: Usage of TEL equipment,</p> <ul style="list-style-type: none"> • Interactive whiteboards • Overhead projectors • Computers • Internet • Web based teaching and learning resources • Camcorders/Digital Cameras • Scanners • Printers • Digital Learning Resources • Video • Audio • Others (Specify) 	<p>Observation/Ticks (tick when action is observed)</p>
<p>TEL Strategies: Types of TEL strategies used by learners and teachers</p> <ul style="list-style-type: none"> • Multi-media presentations • Collaborative learning with technology • Creating with Technology • Creating Texts • Blogging • Blended Learning • Drill and Practice • Other (Specify) 	<p>Observation/Ticks (tick when action is observed)</p>
<p>Interaction in the classroom: defined in terms of the role</p>	<p>Observation/Ticks (tick when</p>

<p>played by both teacher and learners in the lesson.</p> <p>How is participation distributed among the classroom members?</p> <ul style="list-style-type: none"> • patterns of unequal participation may follow lines of teacher domination • teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer) • learners talk – in response to teacher's question or they can initiate it • learners communicate with each other • learners are given opportunity to work by themselves 	<p>action is observed</p>
<p>How is knowledge constructed and shared in the classroom</p> <ul style="list-style-type: none"> • Disputational • Cumulative • Exploratory 	<p>Observation/Ticks (tick when action is observed)</p>
<p>What kind of speech acts do learners perform do they:</p> <ul style="list-style-type: none"> • Assert • Challenge • explain or • respond to teacher's question 	<p>Observation/Ticks (tick when action is observed)</p>
<p>Assessment strategies or tools</p> <ul style="list-style-type: none"> • What is the purpose for assessing in the lessons • Does the teacher clarify the nature of the assessment criteria to learners? • What is the nature of the assessment tasks used by teachers? • The relationship between the chosen assessment task and the specific objectives • What forms of assessment strategies do teachers engage with and how are they used? 	<p>Observation/Ticks (tick when action is observed)</p> <p>Generate feedback</p>

<p>Remedial activities</p> <ul style="list-style-type: none"> • How is remediation planned? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ progressively • Are slow learners given 'corrective' attention or additional assistance? <ul style="list-style-type: none"> ○ Yes ○ No • How is remediation conducted? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ Progressively ○ Guided ○ Differentiated visual resources 	
<p>Enrichment activities</p> <ul style="list-style-type: none"> • How is enrichment planned? <ul style="list-style-type: none"> ○ Structured ○ Unstructured ○ Based on learners ability ○ With no particular format • Are the 'masters' given constructive extra work? <ul style="list-style-type: none"> ○ Yes ○ No • How is enrichment conducted? <ul style="list-style-type: none"> ○ Planned and systematic ○ Unplanned and at the spar of the moment 	
<p>Teaching approaches</p> <ul style="list-style-type: none"> ▪ The lesson is guided by expected learning outcomes which are linked to the curriculum and TEL? ▪ The lesson is well structured (introduction, development, conclusion-review) and use of TEL well defined? ▪ A range of teaching approaches is used: <ul style="list-style-type: none"> - Teacher and pupil questioning - Active learning including use of TEL - Paired Work 	<p>Observation/Ticks (tick when action is observed)</p>

<ul style="list-style-type: none"> - Group work - Talk and discussion - On line based learning - Order thinking and problem solving <p>▪ Necessary and relevant resources including TEL by teacher and/or learners are used to support learners' learning</p> <ul style="list-style-type: none"> • Use of TEL <ul style="list-style-type: none"> ○ To explain tasks ○ For class work sheets ○ Extension activities for what has been taught ○ Language practice ○ Drill and practice <p>▪ Teacher's demonstration of the use of TEL is clear, includes guidance on how low ability learners can learn using TEL.</p> <p>▪ Effective use is made of opportunities to develop TEL skills.</p> <ul style="list-style-type: none"> • Online tasks • Other Activity-state <p>▪ Attention is given to the consolidation of learners' learning</p> <p>▪ Constructive feedback is provided to learners on their learning and use of TEL and teaching and learning is amended in the light of that feedback</p> <p>Learners' engagement in learning</p> <p>▪ Learners work purposefully using TEL during the lesson</p> <ul style="list-style-type: none"> • Answering questions • Learners are provided with TEL avenues to engage in online structured work. 	
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<ul style="list-style-type: none"> ▪ Learners are interested in the lesson content • Inter learner discussions and group activities using TEL ▪ All learners participate in the lesson ▪ Learners are properly challenged in their learning ▪ There is progression in the learners' learning and opportunities for TEL extension tasks ▪ Learners achieve the expected TEL outcome(s) of the lesson 	
---	--

		Tick every instance in each category
Number of positive statements about:		
	Performance	
	Use of TEL	
	Effort	
	Behaviour	
Number of corrective statements about:		
	Performance	
	Use of TEL	
	Effort	

	Behaviour		
	Other events contributing to positive climate		
Number of times/reasons learners called in for:			
	Performance (e.g. further demonstrations of the use of TEL, information)		
	Effort (e.g. lack of effort, to motivate to further effort)		
	Behaviour (e.g. to remind about behaviour or rules)		
Other aspects of lesson climate. List below:			
<ul style="list-style-type: none"> • Engaging • Interactive and • Conducive to learning 			
Learners names used	Frequently	Sometimes	Rarely

(tick one)			
------------	--	--	--

Comments:

		Tick every instance in each category
Number of positive statements about:		
	Performance	
	Use of TEL	
	Effort	
	Behaviour	
Number of corrective statements about:		
	Performance	
	Use of TEL	
	Effort	
	Behaviour	
	Other events contributing to positive climate	
Number of times/reasons learners called in for:		
	Performance (e.g. further demonstrations of the use of TEL, information)	
	Effort (e.g. lack of effort, to motivate to further effort)	

Behaviour (e.g. to remind about behaviour or rules)			
Other aspects of lesson climate.			
List below:			
Learners names used	Frequently	Sometimes	Rarely
(tick one)			

Appendix D – Sample Study Tools Completed by Participants

Appendix D1: Focus Group Discussions 1 Note Taking Summary

Date of Focus Group	April 17, 2015
Location of Focus Group	ICT Suite Room 307
Number of Participants	9 in total – 6 subject teachers, 3 HOD's
Category of Group	Teacher Participants
Moderator Name	M. Acquah
Asst. Moderator Name	_____

Response s to Questions

Q1. What Types of TEL do you use in lessons?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Interactive white board • Scanners • On-line teaching resources • TV and video players (MFL) • Maths practice websites on topics taught • On-line homework sites • Language practice software (MFL) • Online resources Lexia for developing language proficiency in EAL learners 	<p>IWB – Just plain boards. Mine has never worked!</p> <p>Kids never do the online homework anyway!</p>

Q2. How do you use TEL in Lesson Delivery?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none">• To set homework• For practice work on topics we have studied• To keep them engaged (My noisy class) so they don't make noise to attract SLT• After teaching a topic they get free computer time.• To research for homework• To improve my students understanding of what I teach	<ul style="list-style-type: none">• Oh my 10J class – they are so noisy ad will not do any work!• I keep them focused by letting them use the computers.• Just time wasting and too effort consumingI just use my board!

Appendix D2: Questionnaire Completed by a Teacher Participant

Main Teacher Questionnaire

Teacher Questionnaire: Impact of TEL in Teaching

Dear colleague,

This questionnaire aims to find out how you incorporate Technology Enhanced Learning (TEL) in your teaching practice. The questionnaire invites you to share insights on whether or not it is helping you to improve your teaching. It further aims to help assess whether EAL learners in your subject benefit from the use of TEL in teaching.

Information that you provide in this questionnaire will be used strictly for the purpose of academic research and not disclosed to any other person or institution (including in the school, other teachers or external agencies). All findings will be shared with you. Confidentiality regarding your identity will be maintained throughout. I would be grateful for your time to respond to the questions in the accompanying questionnaire.

Thank you

M. Acquah

Section A:

Subject Taught

English

Mathematics

modern foreign languages

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Do you use TEL in your lessons?

Web based teaching and learning resources

Camcorders/Digital Cameras

Scanners

Printers

Others (Specify) *Utube mini videos on calculations and other maths topics -*

3. How do you use TEL in your lessons? (Please Tick)

For explaining work/tasks

For explaining concepts

For class work/tasks

For extension activities for what has been taught/practice

For homework tasks

Other (Specify) _____

4. Has the use of TEL in teaching helped improve your learners' grades in the subject? (Please Tick) YES

NO NOT SURE

If yes, please proceed to question 5

5. How has it helped?

To understand what is taught

Made lessons more interesting

Made EAL learners independent learners

✓ Helped EAL learners complete more homework tasks

✓ Helped EAL learners to improve their grades

✓ Improved EAL learners attention span

✓ Made learners engage more in lessons

Other (Specify) _____

6. Has the use of TEL strategies helped improve your instructional skills? (Please Tick)

✓ YES NO NOT SURE

Has the use of TEL helped EAL learners gain good exam results in your subject? (Please Tick)

✓ YES NO NOT SURE

Do you have challenges using TEL to teach your lessons? (Please Tick)

✓ YES NO NOT SURE

Does lesson preparation incorporating TEL take more time than lessons without TEL?

✓ YES NO NOT SURE

Would you readily use TEL in teaching EAL learners? (Please Tick)

✓ YES NO NOT SURE

Thank you for taking the time to answer these questions.

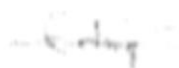
Appendix D3: Questionnaire Completed by a Learner Participant

Dear Learner,

This questionnaire is to help us to find out from you how Technology Enhanced Learning (TEL) may have helped or may be helping you improve your learning and grades in English, Mathematics and modern foreign languages.

The information you give in this questionnaire will be used for the purpose of a research study. Information about you will not be given to anyone (the school, teachers or people outside the school). Information that you give will remain confidential (your identity will be kept secret/anonymous). Please answer the questions freely and tell us what you think. We are interested in learning from the things you have to say.

Thank you



M. Acquah

Section A: General Information

Age: 13

Year Group: 8

Length of time you have lived in England: 13 years

Nationality: Portugal

Languages you speak: Portugues

Section B: Use of Technology Enhanced Learning (TEL) in lessons

Is TEL used in your lessons? (Please Tick)

YES

NO

In which lessons is TEL used? (Please Tick)

Mathematics

English ✓

Science

MFL (modern foreign languages)

Others (Specify).....

3. What types of TEL are used in your lessons? (Please Tick)

interactive whiteboards

Overhead projectors

Computers ✓

Internet

Web based teaching and learning resources

Camcorders/Digital Cameras

Scanners

Printers

Others (Specify)_____

How is TEL used in lessons? (Please Tick)

In explaining work/tasks

In explaining ideas/concepts ✓

For class work/tasks

5. Do you like the idea of TEL being used in your lessons? (Please Tick)

YES

NO

Section C: Impact of Technology Enhanced Learning (TEL)

6. Has the use of TEL helped improve your grades in Mathematics? (Please Tick)

YES

NO



7. How has it helped? (Please Tick)



To understand what is taught



Made lessons more interesting

Made Mathematics more practical

I am able to work on my own using Mathematics study sites

Do more Mathematics homework

Other (Specify) _____

8. Has the use of TEL helped you get good grades in English? (Please Tick)

YES

NO

9. How has it helped? (Please Tick)

To understand what is taught

Made lesson more interesting



Made English more practical

Helped me do more English homework

To work on my own using English study sites

YES NO

11. How has it helped? (Please Tick)

To understand what is taught ✓

Made lesson more interesting

Made MFL more practical

Work on my own using MFL study sites

Other (Specify) _____

Section D: Impact of Technology Enhanced Learning on Curriculum Delivery

12. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) helped you understand your subject better? (Please Tick) ✓

YES NO

13. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) made your homework easier? (Please Tick) ✓

YES NO

14. Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) resources made your exams easier? (Please Tick). ✓

YES NO

Section E: Technology Enhanced Learning and Independent Learning

15. Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) help you study on your own? (Please Tick).

YES NO

17. Does the use of TEL learning resources help you study longer? (Please Tick)

YES NO

18. Has the use of TEL made you more confident in studying on your own? (Please Tick)

YES NO

19. Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) assist you to do homework without help? (Please Tick)

YES NO

Section F: Technology Enhanced Learning and Specific Subject Objectives

20. Has the use of TEL helped you to improve your reading? (Please Tick)

YES NO NOT SURE

21. Has the use of TEL helped you to improve your language learning? (Please Tick)

YES NO NOT SURE

22. Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better? (Please Tick)

YES NO NOT SURE

23. Has the use of TEL strategies helped to improve your mathematical skills and ability? (Please Tick)

YES NO NOT SURE

24. Has the use of TEL helped you to make progress and improvements in your learning?

(Please Tick) YES NO NOT SURE

25. Has the use of TEL helped you to gain good exam results? (Please Tick)

YES NO NOT SURE

27. Has the use of TEL made you want to study more? (Please Tick) ✓

YES NO NOT SURE

28. Does the use of TEL make you more interested in learning? (Please Tick) ✓

YES NO NOT SURE

29. How long can you learn using web based or online resources? (Please Tick) ✓

1) 30 mins - 1 hour 2) 1 hour 30 mins - 2 hours 3) 3 - 4 hours

4) Other (Specify).....

Section G: Technology Enhanced Learning and other subjects

30. Are you able to apply TEL skills you have developed in other subject areas? (Please Tick)

YES (if Yes go to 31) ✓ NO (if No go to 32)

31. How are you able to use TEL in other subjects?

(Please give details and examples)

32. Do you think it is difficult for you to use TEL skills gained in other subject areas? (Please Tick) Yes

No

(if YES Please give reasons)

Appendix D4: Focus Group 2 Discussions Note Taking Summary

Date of Focus Group	23 rd June, 2014
Location of Focus Group	ICT Suite Room 307
Number of Participants	9 in total – 6 subject teachers, 3 HOD's
Category of Group	Teacher Participants
Moderator Name	M. Acquah
Asst. Moderator Name	_____

Introduction

The aim of this focus group discussion is to find out how you as teachers incorporate Technology Enhanced Learning (TEL) in your teaching and assessment practices, its impact and challenges. The discussion invites you to share insights on whether or not it is helping you to improve your teaching and its impact on EAL learners learning - whether EAL learners in your subject benefit from the use of TEL in teaching.

Information that you provide will be used strictly for the purpose of academic research and not disclosed to any other person or institution (including in the school, other teachers or external agencies). All findings will be shared with you. Confidentiality regarding your identity will be maintained throughout. I would be grateful for your time to respond to the questions candidly.

Thank you

Focus

The expectation of the outcomes of this discussion was to provide a robust picture of how the use of TEL had influenced teaching and learning during the study in fundamental ways. This was a summative interview as it sought to compile the experiences of teachers and learners with technology-enhanced teaching and learning.

These are the summative responses from 9 teachers in a focus group interview

Involved In the discussions are: DE – Head of English, LE- English teacher, CE – English teacher, TM – Head of Maths, KM – Maths teacher, NM – Maths teacher, GF – Head of MFL, SF – MFL Teacher and RF – MFL teacher.

Responses to Questions

Q1. What Types of TEL do you use in lessons?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Interactive white board • Scanners • On-line teaching resources • TV and video players (MFL) • Maths practice websites on topics taught • On-line homework sites • Language practice software (MFL) • Online resources Lexia for developing language proficiency in EAL learners 	<ul style="list-style-type: none"> • IWB – Just plain boards. Mine has never worked! • I have given up with the online homework - Kids never do the online homework anyway! • The use of internet based resources is epic especially utube, getting them to do things on their own for once, if they can't do anything I send them to utube to watch the process over and over again.

Q2. How do you use TEL in Lesson Delivery?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • To set homework • For practice work on topics we have studied 	<ul style="list-style-type: none"> • For independent learning its brilliant! • I keep them focused by letting them use the computers. • Just time wasting and too effort consumingI just use my board!

<ul style="list-style-type: none"> • To keep them engaged (My noisy class) so they don't make noise to attract SLT • After teaching a topic they get free computer time. • To research for homework • To improve my students understanding of what I teach 	
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Q3. How did you incorporate TEL into your teaching of EAL learners?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • In class tasks • Homework Tasks • Teaching • Group work tasks • Differentiation • Extension tasks • Explaining work set 	<ul style="list-style-type: none"> • As a language translator for the things I teach that I cannot explain properly to them. • To translate my worksheets – differentiation right!

Q4 How many minutes or hours per week did learners' use TEL's?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • 5 hours (Maths) • 5 hours (English) • 1 Hour 40 minutes (MFL) 	<ul style="list-style-type: none"> • Literally 10 minutes every lesson, I'll have to do the maths.

Just then the fire alarm goes off! Teacher participants scramble to their feet, some unsure, some grabbing their things. Indecisive we make for the door. Suddenly the alarm stops and a loud voice booms through the tannoy apologising and asking classes to get back to work claiming it was a fire alarm mal function.

Some teachers sit disgusted and appalled, others grumble as they make their back to their

seats. KM bursts into hysterical fits of laughter. LE and SF join in to share in the fun. TM interjects angrily 'Coronation Street!' The others see the fun. We all join in - bursting into chaotic laughter.

It takes about 5 minutes for the group to settle – the discussion resumes.

Q5. How confident are you now in the use of TEL in teaching?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Very Confident • Confident • To a large extent confident 	<ul style="list-style-type: none"> • I am petrified every lesson I have to use TEL, you just don't know what to expect. I am no Tech savy!

Q6. How did EAL learners respond to the use of TEL in teaching?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Learners were enthusiastic • Most of the time engaged in tasks set • Responded positively by engaging with the teaching • Participated fully in lesson activities • Willing to complete tasks set • Completed more work 	<ul style="list-style-type: none"> • The kids will do anything I set them as long as there is 'Free time' at the end of the lesson to play games I might get into trouble one of these days with SLT.

Q7. Do EAL learners make progress when TEL based strategies are used?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes, a considerable amount of progress 	<ul style="list-style-type: none"> • I can't just tell the difference, will have to check my test scores.

Q8. How easy or difficult is it employing TEL based strategies to teach EAL learners?

Brief Summary/Key Points	Notable Quotes
	<ul style="list-style-type: none"> • It's just too much work.

<ul style="list-style-type: none"> • Extremely challenging in incorporating into learning tasks • Challenging in preparing good differentiated lessons for mixed ability groups • Easy to use for home work tasks • Easy to use for class extension tasks • Easy to use for teaching/delivering lessons 	<ul style="list-style-type: none"> • Learning to use digital resources is just time consuming and an arduous task.
--	---

Q9. How effective was the use of TEL based strategies?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • To a large extent extremely effective, learners responded well to TEL resources and strategies • Good. 	

Q10. Have you received any training for the use of TEL since?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes – staff insets • Whole school inset and training • One to one support from ICT department – on request. • Yes – More ongoing support and training on the use of emerging technologies 	<ul style="list-style-type: none"> • The kids, the IT gurus. Every day there is something new they are coming with in lessons.

Specific

Q11. What types of TEL - related training and support did you receive in school during the study's implementation?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • How to use specific ICT equipment • How to incorporate TEL in lessons 	<ul style="list-style-type: none"> • Training on everything! Am no tech guru.

<ul style="list-style-type: none"> • How to use TEL in starter tasks and plenaries • TEL in planning and supporting lessons • The use of TEL to challenge more able learners • Making TEL lessons more engaging and interesting • Training on how to locate TEL teaching and learning resources 	
--	--

Q12. What type of progress have learners in your lessons made so far?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Learners are able to work more independently • My kids have become more engaged in lessons, when it comes to using computers, you cannot hear a pin drop. • Learners have become more confident • My pupils have become more focused and less disruptive and distracted in lessons • There have been more homework returns • Subject area knowledge has improved considerably • There has been progress that has reflected in grades – grades have improved. 	<ul style="list-style-type: none"> • Never a boring lesson even when I have not fully prepared for the lesson.

Q13. What type of progress have learners in your lessons made so far?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Learners are able to work more independently • More engaged in lessons, which is becoming the new norm • Learners have become more confident • Learners have become more focused and less disruptive and distracted in lessons • There have been more homework returns • Subject area knowledge has improved considerably • There has been progress that has reflected in grades – grades have improved. 	<ul style="list-style-type: none"> • My EAL learners are now able to translate their own work sheets and class tasks by using translation websites. It's made my prep work easier.

Q14. How do you measure the progress made by learners??

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Through improvement in subject examination and continuous assessment grades • Quality of homework returns • Confidence displayed in group work tasks and lesson presentation 	<ul style="list-style-type: none"> • Less chatter in lessons can only signal engagement, right?

Q15. Did learners approach to learning change?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes – To a very large extent, they try out things for themselves before they ask for my help • Learners have become more positive, confident and engaged in lessons • I can clearly see they enjoy lessons • Become more enthusiastic. 	

Q16. Did the use of TEL change your approach to teaching?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes to a considerable degree – enabled me to plan lessons purposefully with the learning needs of learners in mind • Made me consciously differentiate teaching learning resources to match the different ability levels of learners 	<ul style="list-style-type: none"> • Made me sit up and do more.

Q17. Did the use of TEL change the way learners are supported in lessons and in the subject?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes – Introduction of more in class support and teaching assistants for SEN and EAL learners • Less support for mix ability learners (Gradually became more confident) 	<ul style="list-style-type: none"> •

Q18. Did the use of TEL improve learner's grades in the subject?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes • Considerably • Visible change in grades, pupils scoring more high grades 	<ul style="list-style-type: none"> •

Q19. Did the use of TEL have an impact on learners' motivation, attainment, attitude, engagement and approach to learning?

Brief Summary/Key Points	Notable Quotes

<ul style="list-style-type: none"> • Yes • They are motivated in lessons • Sound more confident • They are willing to try out things • Grades are up 	<ul style="list-style-type: none"> • Definitely less distracted
---	--

Q20. How did you evaluate the stage of adoption and integration of TEL level into your teaching practice?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Developing – Proficient • Getting there • Making progress • I have become better. • Lots of improvement 	

Q21. Were your expected outcomes realised?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • Yes • Expected outcomes have almost been realised. 	

Q22. To what extent were they realised?

Brief Summary/Key Points	Notable Quotes
<ul style="list-style-type: none"> • To a large extent there had been improvement in grades • There was better engagement with teaching learning resources • Learners were more engaged in lessons 	

Appendix D5: Teaching and Learning Observation Schedule - English

The following particular classroom activities are the focal point of the observations

Physical equipment: Usage of TEL equipment,

TEL Strategies: Types of TEL strategies used by learners and teachers

Organisational frames: class size, composition of class (learners are of mixed abilities or streamed according to capability)

Setting the scene:

- Introduction of lesson focusing on objectives
- how are the objectives framed (do they have all the four requirements)
- At what level are learners in (Cognitive levels – Bloom)
- Does the teacher communicate the objectives to learners
- How well are the objectives explained to learners

Interaction in the classroom: defined in terms of the role played by both teacher and learners in the lesson.

How is participation distributed among the classroom members?

- Patterns of unequal participation may follow lines of teacher domination
- teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer)
- learners talk – in response to teacher's question or they can initiate it
- learners communicate with each other
- learners are given opportunity to work by themselves

What characterise classroom talk i.e. exploratory how is knowledge constructed and shared in the classroom

- Disputational
- Cumulative
- Exploratory

What kind of speech acts do learners perform do they:

- Assert
- Challenge
- explain or
- respond to teacher's question

What is the nature of reasoning that is encouraged in the classroom?

Assessment strategies or tools

- What is the purpose for assessing in the lessons
- Does the teacher clarify the nature of the assessment criteria to learners?
- What is the nature of the assessment tasks used by teachers?
- The relationship between the chosen assessment task and the specific objectives
- What forms of assessment strategies do teachers engage with and how are they used?

Feedback

- Does the teacher praise or encourages learners
- How is feedback communicated to learners?
- Does it provide the learners a realistic picture of their progress?
- Does it provide learners a sense of how to improve?

Remedial activities

- How is remediation planned?
- Are slow learners given 'corrective' attention or additional assistance?
- How is remediation conducted?

Enrichment activities

- How is enrichment planned?
- Are the 'masters' given constructive extra work?
- How is enrichment conducted?

Observational Ticks and Tallies			
Class: 11 W	No of learners: 25	Date: 13 th May 2014	Teacher: DE
Curricular area: English	Time: period 1	Duration: 50 mins	Observer: M. Acquah

Composition of class: learners are of mixed abilities

or streamed according to capability

Setting the scene:	Observation/Ticks (tick when action is observed) √ √
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<ul style="list-style-type: none"> • Introduction of lesson focusing on objectives • how are the objectives framed (do they have all the four requirements) • At what level are learners in (Cognitive levels – Bloom)? <ul style="list-style-type: none"> ○ Knowledge ○ Comprehension ○ Application ○ Analysis ○ Synthesis • Does the teacher communicate the objectives to learners • How well are the objectives explained to learners <ul style="list-style-type: none"> ○ Poor ○ Partially well ○ Very well 	<ul style="list-style-type: none"> √ √ √ √ √ √
<p>Physical equipment: Usage of TEL equipment,</p> <ul style="list-style-type: none"> • Interactive whiteboards • Overhead projectors • Computers • Internet • Web based teaching and learning resources • Camcorders/Digital Cameras • Scanners • Printers • Digital Learning Resources • Video • Audio • Others (Specify) 	<p>Observation/Ticks (tick when action is observed)</p> <ul style="list-style-type: none"> √ √ √ √ √ √ √ √ √ √ √ √
<p>TEL Strategies: Types of TEL strategies used by learners and teachers</p> <ul style="list-style-type: none"> • Multi-media presentations • Collaborative learning with technology • Creating with Technology 	<p>Observation/Ticks (tick when action is observed)</p> <ul style="list-style-type: none"> √ √ √ √

<ul style="list-style-type: none"> • Creating Texts • Blogging • Blended Learning • Drill and Practice • Other (Specify) 	√
<p>Interaction in the classroom: defined in terms of the role played by both teacher and learners in the lesson.</p> <p>How is participation distributed among the classroom members?</p> <ul style="list-style-type: none"> • patterns of unequal participation may follow lines of teacher domination • teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer) • learners talk – in response to teacher's question or they can initiate it • learners communicate with each other • learners are given opportunity to work by themselves • 	Observation/Ticks (tick when action is observed)
<p>How is knowledge constructed and shared in the classroom</p> <ul style="list-style-type: none"> • Disputational • Cumulative • Exploratory 	Observation/Ticks (tick when action is observed) √
<p>What kind of speech acts do learners perform do they:</p> <ul style="list-style-type: none"> • Assert • Challenge • explain or • respond to teacher's question 	Observation/Ticks (tick when action is observed) √ √ √
<p>Assessment strategies or tools</p> <ul style="list-style-type: none"> • What is the purpose for assessing in the lessons • Does the teacher clarify the nature of the assessment 	Observation/Ticks (tick when action is observed) Generate feedback Yes

<p>criteria to learners?</p> <ul style="list-style-type: none"> • What is the nature of the assessment tasks used by teachers? • The relationship between the chosen assessment task and the specific objectives • What forms of assessment strategies do teachers engage with and how are they used? 	<p>Questions and Answers, Drill and practice.</p> <p>Chosen assessments matches the learning objectives.</p> <p>Formative assessment.</p>
<p>Remedial activities</p> <ul style="list-style-type: none"> • How is remediation planned? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ progressively • Are slow learners given 'corrective' attention or additional assistance? <ul style="list-style-type: none"> ○ Yes ○ No • How is remediation conducted? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ Progressively ○ Guided ○ Differentiated visual resources 	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>
<p>Enrichment activities</p> <ul style="list-style-type: none"> • How is enrichment planned? <ul style="list-style-type: none"> ○ Structured ○ Unstructured ○ Based on learners ability ○ With no particular format • Are the 'masters' given constructive extra work? <ul style="list-style-type: none"> ○ Yes ○ No • How is enrichment conducted? <ul style="list-style-type: none"> ○ Planned and systematic ○ Unplanned and at the spar of the moment 	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>

Teaching approaches	Observation/Ticks (tick when action is observed)
<ul style="list-style-type: none"> ▪ The lesson is guided by expected learning outcomes which are linked to the curriculum and TEL? 	√
<ul style="list-style-type: none"> ▪ The lesson is well structured (introduction, development, conclusion-review) and use of TEL well defined? 	√
<ul style="list-style-type: none"> ▪ A range of teaching approaches is used: 	√
<ul style="list-style-type: none"> - Teacher and pupil questioning 	√
<ul style="list-style-type: none"> - Active learning including use of TEL 	√
<ul style="list-style-type: none"> - Paired Work 	√
<ul style="list-style-type: none"> - Group work 	√
<ul style="list-style-type: none"> - Talk and discussion 	√
<ul style="list-style-type: none"> - On line based learning 	√
<ul style="list-style-type: none"> - Order thinking and problem solving 	√
<ul style="list-style-type: none"> ▪ Necessary and relevant resources including TEL by teacher and/or learners are used to support learners' learning 	√
<ul style="list-style-type: none"> • Use of TEL 	√
<ul style="list-style-type: none"> ○ To explain tasks 	√
<ul style="list-style-type: none"> ○ For class work sheets 	√
<ul style="list-style-type: none"> ○ Extension activities for what has been taught 	√
<ul style="list-style-type: none"> ○ Language practice 	√
<ul style="list-style-type: none"> ○ Drill and practice 	√
<ul style="list-style-type: none"> ▪ Teacher's demonstration of the use of TEL is clear, includes guidance on how low ability learners can learn using TEL. 	√
<ul style="list-style-type: none"> ▪ Effective use is made of opportunities to develop TEL skills. 	√
<ul style="list-style-type: none"> • Online tasks 	√

	Performance Use of TEL	1111(4)
	Effort	1111111(7)
	Behaviour	11111(5)
Number of corrective statements about:		
	Performance	111111(6)
	Use of TEL	11111(5)
	Effort	1111111(7)
	Behaviour	11111111(8)
	Other events contributing to positive climate	Set level challenges and language games
Number of times/reasons learners called in for:		
	Performance (e.g. further demonstrations of the use of TEL, information)	11111(5)
	Effort (e.g. lack of effort, to motivate to	1111(4)

	further effort)		
	Behaviour (e.g. to remind about behaviour or rules)	11111(5)	
Other aspects of lesson climate. List below:			
<ul style="list-style-type: none"> • Engaging • Interactive and • Conducive to learning 			
Learners names used (tick one)	Frequently ✓	Sometimes	Rarely

Comments:

Appendix D6: Teaching and Learning Observation Schedule - Maths

The following particular classroom activities are the focal point of the observations

Physical equipment: Usage of TEL equipment,

TEL Strategies: Types of TEL strategies used by learners and teachers

Organisational frames: class size, composition of class (learners are of mixed abilities or streamed according to capability)

Setting the scene:

- Introduction of lesson focusing on objectives

- how are the objectives framed (do they have all the four requirements)
- At what level are learners in (Cognitive levels – Bloom)
- Does the teacher communicate the objectives to learners
- How well are the objectives explained to learners

Interaction in the classroom: defined in terms of the role played by both teacher and learners in the lesson.

How is participation distributed among the classroom members?

- patterns of unequal participation may follow lines of teacher domination
- teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer)
- learners talk – in response to teacher's question or they can initiate it
- learners communicate with each other
- learners are given opportunity to work by themselves

What characterise classroom talk i.e. exploratory how is knowledge constructed and shared in the classroom

- Disputational
- Cumulative
- Exploratory

What kind of speech acts do learners perform do they:

- Assert
- Challenge
- explain or
- respond to teacher's question

What is the nature of reasoning that is encouraged in the classroom?

Assessment strategies or tools

- What is the purpose for assessing in the lessons
- Does the teacher clarify the nature of the assessment criteria to learners?
- What is the nature of the assessment tasks used by teachers?
- The relationship between the chosen assessment task and the specific objectives
- What forms of assessment strategies do teachers engage with and how are they used?

Feedback

- Does the teacher praise or encourages learners

- How is feedback communicated to learners?
- Does it provide the learners a realistic picture of their progress?
- Does it provide learners a sense of how to improve?

Remedial activities

- How is remediation planned?
- Are slow learners given 'corrective' attention or additional assistance?
- How is remediation conducted?

Enrichment activities

- How is enrichment planned?
- Are the 'masters' given constructive extra work?
- How is enrichment conducted?

Observational Ticks and Tallies			
Class: 11 E	No of learners: 25	Date: 22nd May 2014	Teacher: TM
Curricular area: MFL	Time: period 1	Duration: 50 mins	Observer: M. Acquah
Setting the scene: <ul style="list-style-type: none"> • Introduction of lesson focusing on objectives • how are the objectives framed (do they have all the four requirements) • At what level are learners in (Cognitive levels – Bloom) <ul style="list-style-type: none"> ○ Knowledge ○ Comprehension ○ Application ○ Analysis ○ Synthesis • Does the teacher communicate the objectives to learners • How well are the objectives explained to learners <ul style="list-style-type: none"> ○ Poor ○ Partially well 			Observation/Ticks (tick when action is observed) ✓ ✓ ✓ ✓ ✓

<p>played by both teacher and learners in the lesson.</p> <p>How is participation distributed among the classroom members?</p> <ul style="list-style-type: none"> • patterns of unequal participation may follow lines of teacher domination • teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer) • learners talk – in response to teacher's question or they can initiate it • learners communicate with each other • learners are given opportunity to work by themselves 	<p>√</p> <p>√</p> <p>√</p> <p>√</p>
<p>How is knowledge constructed and shared in the classroom</p> <ul style="list-style-type: none"> • Disputational • Cumulative • Exploratory 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p>
<p>What kind of speech acts do learners perform do they:</p> <ul style="list-style-type: none"> • Assert • Challenge • explain or • respond to teacher's question 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p> <p>√</p>
<p>Assessment strategies or tools</p> <ul style="list-style-type: none"> • What is the purpose for assessing in the lessons • Does the teacher clarify the nature of the assessment criteria to learners? • What is the nature of the assessment tasks used by teachers? • The relationship between the chosen assessment task and the specific objectives • What forms of assessment strategies do teachers engage with and how are they used? 	<p>Observation/Ticks (tick when action is observed</p> <p>To re-teach and explain skills and concepts learners get wrong) Find difficult to understand).</p> <p>Partially</p> <p>Computer generated responses.</p> <p>Assessment tasks Synchronizes with learning objectives.</p> <p>Visual checks and corrective</p>

	statements (Formative).
<p>Feedback</p> <ul style="list-style-type: none"> • Does the teacher praise or encourages learners • How is feedback communicated to learners? • Does it provide the learners a realistic picture of their progress? • Does it provide learners a sense of how to improve? 	<p>Observation/Ticks (tick when action is observed)</p> <p>Yes Verbal and hand and head gestures Yes</p> <p>Sometimes</p>
<p>Remedial activities</p> <ul style="list-style-type: none"> • How is remediation planned? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ progressively • Are slow learners given 'corrective' attention or additional assistance? <ul style="list-style-type: none"> ○ Yes ○ No • How is remediation conducted? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ Progressively ○ Guided • Differentiated visual resources 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p> <p>√</p> <p>√ √</p>
<p>Enrichment activities</p> <ul style="list-style-type: none"> • How is enrichment planned? <ul style="list-style-type: none"> ○ Structured ○ Unstructured ○ Based on learners ability ○ With no particular format • Are the 'masters' given constructive extra work? <ul style="list-style-type: none"> ○ Yes ○ No • How is enrichment conducted? <ul style="list-style-type: none"> ○ Planned and systematic ○ Unplanned and at the spar of the moment 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p> <p>√</p> <p>√</p>

Teaching approaches	Observation/Ticks (tick when action is observed)
<ul style="list-style-type: none"> ▪ The lesson is guided by expected learning outcomes which are linked to the curriculum and TEL? 	√
<ul style="list-style-type: none"> ▪ The lesson is well structured (introduction, development, conclusion-review) and use of TEL well defined? 	√
<ul style="list-style-type: none"> ▪ A range of teaching approaches is used: 	
<ul style="list-style-type: none"> - Teacher and pupil questioning 	√
<ul style="list-style-type: none"> - Active learning including use of TEL 	√ √ √ √
<ul style="list-style-type: none"> - Guided activity and discovery 	
<ul style="list-style-type: none"> - Co-operative/collaborative learning 	
<ul style="list-style-type: none"> - Talk and discussion 	
<ul style="list-style-type: none"> - On line based learning 	√ √ √
<ul style="list-style-type: none"> - Order thinking and problem solving 	√
<ul style="list-style-type: none"> ▪ Necessary and relevant resources including TEL by teacher and/or learners are used to support learners' learning 	√
<ul style="list-style-type: none"> • Use of TEL 	
<ul style="list-style-type: none"> ○ To explain tasks 	√
<ul style="list-style-type: none"> ○ For class work sheets 	
<ul style="list-style-type: none"> ○ Extension activities for what has been taught 	√
<ul style="list-style-type: none"> ○ Language practice 	
<ul style="list-style-type: none"> ○ Drill and practice 	
<ul style="list-style-type: none"> ▪ Teacher's demonstration of the use of TEL is clear, includes guidance on how low ability learners can learn using TEL. 	√
<ul style="list-style-type: none"> ▪ Effective use is made of opportunities to develop TEL skills. 	
<ul style="list-style-type: none"> • Online tasks 	√

<ul style="list-style-type: none"> • Other Activity-state ▪ Attention is given to the consolidation of learners' learning ▪ Constructive feedback is provided to learners on their learning and use of TEL and teaching and learning is amended in the light of that feedback <p>Learners' engagement in learning</p> <ul style="list-style-type: none"> ▪ Learners work purposefully using TEL during the lesson • Answering questions • Learners are provided with TEL avenues to engage in online structured work. ▪ Learners are interested in the lesson content • Inter learner discussions and group activities using TEL ▪ All learners participate in the lesson ▪ Learners are properly challenged in their learning ▪ There is progression in the learners' learning and • opportunities for TEL extension tasks ▪ Learners achieve the expected TEL outcome(s) of the lesson 	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>
---	--

	Tick every instance in each category
--	--------------------------------------

Number of positive statements about:		
	Performance Use of TEL	11111111(8)
	Effort	11111(5)
	Behaviour	111(3)
Number of corrective statements about:		
	Performance	1111(4)
	Use of TEL	11111111(8)
	Effort	111111111(9)
	Behaviour	111111(6)
	Other events contributing to positive climate	Set level challenges and language games
Number of times/reasons learners called in for:		
	Performance (e.g. further demonstrations of the use of TEL, information)	111(3)

	Effort (e.g. lack of effort, to motivate to further effort)	111111(6)	
	Behaviour (e.g. to remind about behaviour or rules)	11111111(8)	
Other aspects of lesson climate. List below:			
Learners names used (tick one)	Frequently <input checked="" type="checkbox"/>	Sometimes	Rarely

Comments:

Appendix D7: Teaching and Learning Observation Schedule - MFL

Teaching and Learning Observation Schedule - MFL

The following particular classroom activities are the focal point of the observations

Physical equipment: Usage of TEL equipment,

TEL Strategies: Types of TEL strategies used by learners and teachers

Organisational frames: class size, composition of class (learners are of mixed abilities or streamed according to capability)

Setting the scene:

- Introduction of lesson focusing on objectives
- how are the objectives framed (do they have all the four requirements)
- At what level are learners in (Cognitive levels – Bloom)
- Does the teacher communicate the objectives to learners
- How well are the objectives explained to learners

Interaction in the classroom: defined in terms of the role played by both teacher and learners in the lesson.

How is participation distributed among the classroom members?

- patterns of unequal participation may follow lines of teacher domination
- teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer)
- learners talk – in response to teacher's question or they can initiate it
- learners communicate with each other
- learners are given opportunity to work by themselves

What characterise classroom talk i.e. how is knowledge constructed and shared in the classroom

- Disputational
- Cumulative
- Exploratory

What kind of speech acts do learners perform do they:

- Assert
- Challenge
- explain or
- respond to teacher's question

What is the nature of reasoning that is encouraged in the classroom?

Assessment strategies or tools

- What is the purpose for assessing in the lessons
- Does the teacher clarify the nature of the assessment criteria to learners?
- What is the nature of the assessment tasks used by teachers?
- The relationship between the chosen assessment task and the specific objectives
- What forms of assessment strategies do teachers engage with and how are they

used?

Feedback

- Does the teacher praise or encourages learners
- How is feedback communicated to learners?
- Does it provide the learners a realistic picture of their progress?
- Does it provide learners a sense of how to improve?

Remedial activities

- How is remediation planned?
- Are slow learners given 'corrective' attention or additional assistance?
- How is remediation conducted?

Enrichment activities

- How is enrichment planned?
- Are the 'masters' given constructive extra work?
- How is enrichment conducted?

Observational Ticks and Tallies			
Class: 11 E	No of learners: 25	Date: 7 th May 2014	Teacher: GF
Curricular area: MFL	Time: period 1	Duration: 50 mins	Observer: M. Acquah
Setting the scene: <ul style="list-style-type: none"> • Introduction of lesson focusing on objectives • how are the objectives framed (do they have all the four requirements) • At what level are learners in (Cognitive levels – Bloom) <ul style="list-style-type: none"> ○ Knowledge ○ Comprehension ○ Application ○ Analysis ○ Synthesis • Does the teacher communicate the objectives to learners • How well are the objectives explained to learners <ul style="list-style-type: none"> ○ Poor ○ Partially well 			Observation/Ticks (tick when action is observed) √ √ √ √ √ √ √

<p>How is participation distributed among the classroom members?</p> <ul style="list-style-type: none"> • patterns of unequal participation may follow lines of teacher domination • teacher and learners' roles in the lesson (i.e. teacher explains and ask questions – learners answer) • learners talk – in response to teacher's question or they can initiate it • learners communicate with each other • learners are given opportunity to work by themselves 	<p>√ √ √ √</p>
<p>How is knowledge constructed and shared in the classroom</p> <ul style="list-style-type: none"> • Disputational • Cumulative • Exploratory 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p>
<p>What kind of speech acts do learners perform do they:</p> <ul style="list-style-type: none"> • Assert • Challenge • explain or • respond to teacher's question 	<p>Observation/Ticks (tick when action is observed)</p> <p>√ √</p>
<p>Assessment strategies or tools</p> <ul style="list-style-type: none"> • What is the purpose for assessing in the lessons • Does the teacher clarify the nature of the assessment criteria to learners? • What is the nature of the assessment tasks used by teachers? • The relationship between the chosen assessment task and the specific objectives • What forms of assessment strategies do teachers engage with and how are they used? 	<p>Observation/Ticks (tick when action is observed) To check for learning and provide feedback for learners</p> <p>Yes – using evaluation criteria</p> <p>Question and answers, mini quizzes and formative assessment tasks</p> <p>Assessment tasks match lesson expected lesson outcomes</p> <p>Formative assessment, visual checks and instant corrective feedback to improve work, peer and self-assessments.</p>

<p>Feedback</p> <ul style="list-style-type: none"> • Does the teacher praise or encourages learners • How is feedback communicated to learners? • Does it provide the learners a realistic picture of their progress? • Does it provide learners a sense of how to improve? 	<p>Observation/Ticks (tick when action is observed)</p> <p>√ Verbally and role modelling</p> <p>Yes Yes</p>
<p>Remedial activities</p> <ul style="list-style-type: none"> • How is remediation planned? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ progressively • Are slow learners given 'corrective' attention or additional assistance? <ul style="list-style-type: none"> ○ Yes ○ No • How is remediation conducted? <ul style="list-style-type: none"> ○ Structured ○ Systematic ○ Unstructured ○ Progressively ○ Guided • Differentiated visual resources 	<p>Observation/Ticks (tick when action is observed)</p> <p>√ √ √</p> <p>√</p> <p>√</p> <p>√ √</p> <p>√ √ √</p>
<p>Enrichment activities</p> <ul style="list-style-type: none"> • How is enrichment planned? <ul style="list-style-type: none"> ○ Structured ○ Unstructured ○ Based on learners ability ○ With no particular format • Are the 'masters' given constructive extra work? <ul style="list-style-type: none"> ○ Yes ○ No • How is enrichment conducted? <ul style="list-style-type: none"> ○ Planned and systematic ○ Unplanned and at the spar of the moment 	<p>Observation/Ticks (tick when action is observed)</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>

Teaching approaches	Observation/Ticks
<ul style="list-style-type: none"> ▪ The lesson is guided by expected learning outcomes which are linked to the curriculum and TEL? 	√
<ul style="list-style-type: none"> ▪ The lesson is well structured (introduction, development, conclusion-review) and use of TEL well defined? 	√
<ul style="list-style-type: none"> ▪ A range of teaching approaches is used: 	
<ul style="list-style-type: none"> - Teacher and pupil questioning 	√
<ul style="list-style-type: none"> - Active learning including use of TEL 	√ √ √
<ul style="list-style-type: none"> - Guided activity and discovery 	√ √ √
<ul style="list-style-type: none"> - Co-operative/collaborative learning 	√
<ul style="list-style-type: none"> - Talk and discussion 	
<ul style="list-style-type: none"> - On line based learning 	
<ul style="list-style-type: none"> - Order thinking and problem solving 	√ √ √
<ul style="list-style-type: none"> ▪ Necessary and relevant resources including TEL by teacher and/or learners are used to support learners' learning 	√ √
<ul style="list-style-type: none"> • Use of TEL 	√
<ul style="list-style-type: none"> ○ To explain tasks 	
<ul style="list-style-type: none"> ○ For class work sheets 	√
<ul style="list-style-type: none"> ○ Extension activities for what has been taught 	√
<ul style="list-style-type: none"> ○ Language practice 	√
<ul style="list-style-type: none"> ○ Drill and practice 	√
<ul style="list-style-type: none"> ▪ Teacher's demonstration of the use of TEL is clear, includes guidance on how low ability learners can learn using TEL. 	√ √
<ul style="list-style-type: none"> ▪ Effective use is made of opportunities to develop TEL skills. 	√
<ul style="list-style-type: none"> • Online tasks 	

	Use of TEL	
	Effort	1111111111(10)
	Behaviour	1111111(7)
Number of corrective statements about:		
	Performance	11111(5)
	Use of TEL	1111(4)
	Effort	1111(4)
	Behaviour	111(3)
	Other events contributing to positive climate	Set level challenges and language games
Number of times/reasons learners called in for:		
	Performance (e.g. further demonstrations of the use of TEL, information)	1111111(7)
	Effort (e.g. lack of effort, to motivate to further effort)	111(3)

	Behaviour (e.g. to remind about behaviour or rules)	1111(4)	
Other aspects of lesson climate. List below:			
Learners names used (tick one)	Frequently <input checked="" type="checkbox"/>	Sometimes	Rarely

Comments:

Appendix E – Study Authorisation Letters

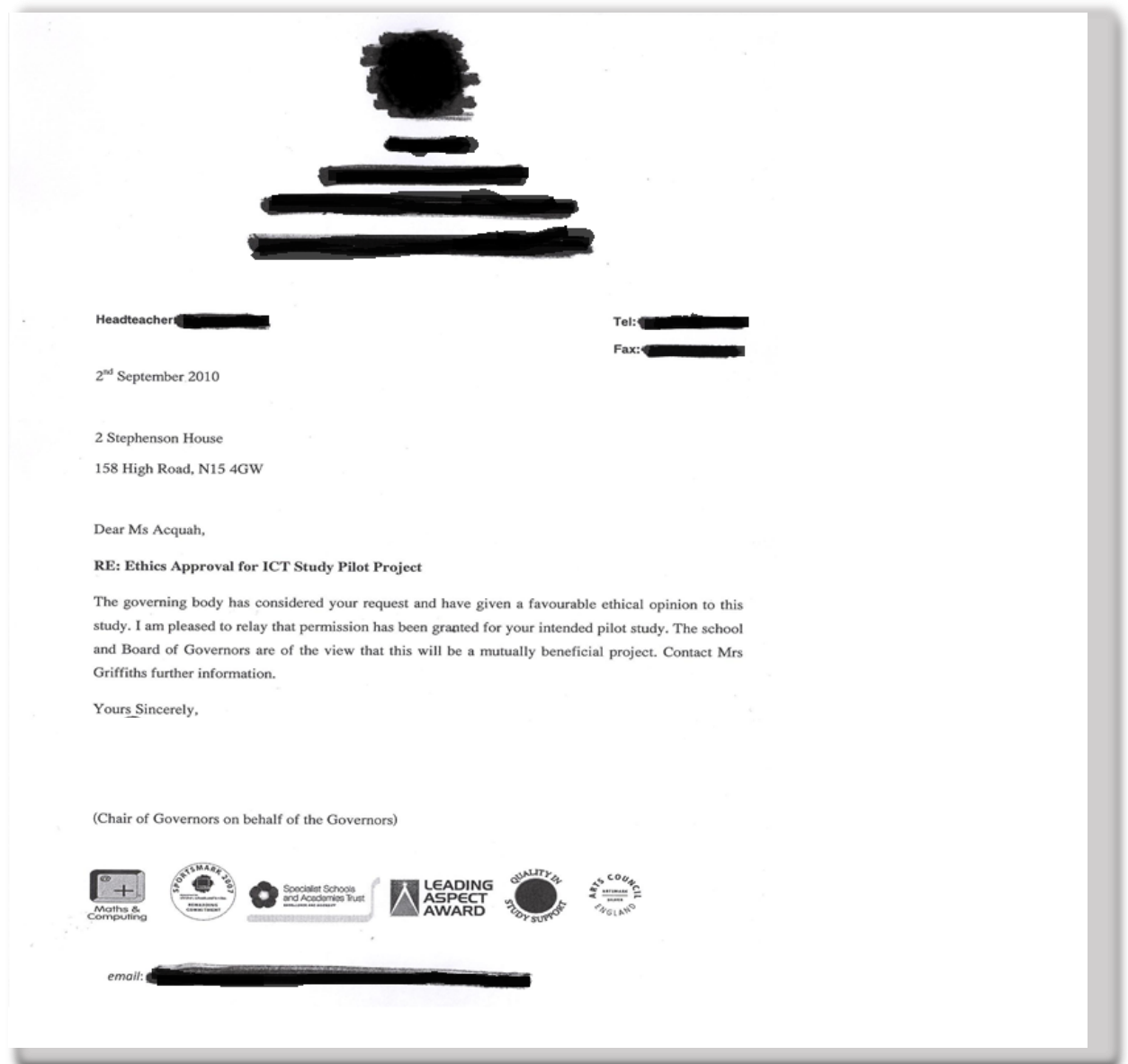
Appendix E1: Data Manager Authorisation Letter (2010)



Appendix E2: Data Manager Authorisation Letter (2013)



Appendix E3: Board of Governors Approval Letter to Pilot Study



Appendix E4: Letter to Head Teacher Requesting Approval for Study (2013)



24th May 2013

Dear Sir,

Request for Research Study Authorisation

As a follow up to the pilot study conducted in 2010, I would like to request permission from the school to carry out a research study on the use of Technology Enhanced Learning in the teaching of English as an Additional Language (EAL) learners. My research is being supervised by Dr. P. Chopra and Mr. W. Goddard from the School of Education, University of Greenwich who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details.

This study will involve 50 EAL learners, selected from the Year 10 cohort, 6 subject teachers (from the English, Mathematics and modern foreign languages departments) and the heads of departments for the three subject areas specified.

This study is required for the completion of my doctoral research thesis. Information gathered will be used strictly for academic purposes and not for commercial gains. Please find enclosed information sheets for the intended study.

I would be extremely grateful if permission is granted allowing me to conduct the study in the school.

Thank you for your kind consideration.

Yours sincerely,

M. Acquah

Mary Acquah (Head of ICT)

Appendix E5: Head Teacher Approval Letter for Study (2013)



Appendix F – Study Information Sheets

Appendix F1: Teacher Information Sheet



My name is Mary Acquah and I am a research student at the University of Greenwich.

I am undertaking a research study to find out how Technology Enhanced Learning (TEL) is used to teach Mathematics, English and modern foreign languages and how it could make learning easier for English as an Additional Language (EAL) learners. My research is being supervised by Dr. P. Chopra and Mr. W. Goddard from the School of Education, University of Greenwich who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details.

Your Role

If you agree to take part in this study you will be a teacher participant.

You are being invited to take part in a research study on integrating the use of TEL in teaching and learning. Before you decide whether or not you will take part, it is important for you to understand why the study is being carried out and what it will involve. Please take time to read the following information carefully.

Title of Research

Facilitating EAL Learners' Attainment Using Technology Enhanced Learning (TEL)

What is the purpose of the study?

The purpose of this study is to find out under what circumstances TEL can be used in teaching to improve EAL learners' learning and exam results in your subject area.

Do I have to take part?

Participating in this study is voluntary. You are not obliged to participate if you do not wish to do so. Your permission is being sought for your participation in this study. Your written consent will be required if you agree to participate in this study.

How will I be involved in this study?

Information will be collected from you for the study using a questionnaire of 10 questions. Questions will focus on how you use TEL in your teaching and its impact on learning. You will have the option of remaining anonymous. Your lessons will also be observed by the researcher (Mary Acquah) to understand how you use TEL in your teaching to support EAL learners and under what conditions its usage may be effective. You will also be invited to participate in two semi-structured interviews at the start and end of the study. These will be 40 minutes long.

What are the possible benefits of taking part?

Results of the study will benefit you by highlighting the conditions under which the use of TEL to teach EAL learners is most effective. This may help you with enhancing teaching/learning strategies to make the learning of your subject easier for EAL learners. You will be able to identify and analyse further how EAL learners respond to the use of TEL in teaching and how it may help them in their learning.

Findings from other subject areas and good practice will also be shared with you. This may contribute to improving practice. An understanding of conditions under which TEL can be used to help EAL learners will be shared. This may help to improve grades. On the whole, these findings will further serve as a guide to help improve teaching methods for the benefit of the learner. Findings from the study will be shared with you at the end of the study.

Will what I say in this study be kept confidential?

Information you provide for this study will be kept strictly confidential and your identity will not be disclosed to anybody inside or outside the school.

Your name will not be asked on the questionnaires. Your identity will also be kept anonymous in research data from lesson observations and interviews. Information you share will be kept safe, secure and confidential and will only be used for the purpose for which it has been collected.

You can withdraw from the study at any time, whenever you feel unable to continue, even after giving your written permission. There will be no negative repercussions. You will not be misled to give information without your knowledge or approval. The purpose and use of information collected will be explained to you before it is gathered.

You will always be made aware of data or information being gathered and what it is being used for at every stage of the process. Necessary steps will be taken to ensure that you are not stressed and overburdened. Your interest will be protected throughout this study to ensure that you are safe and that the study does not interfere with your work.

What will happen to the results of the research study?

The results of this study will be used strictly for academic purpose. No part of the study will be used for commercial gain. The results will be presented to the University of Greenwich as the researcher's doctoral thesis.

The study will only be published, if required, to inform EAL and academic researchers. This study may serve as a stepping stone for future research and provide guidance to help teach EAL learners more effectively.

Who is organising and funding the research?

This research study is being organised by the researcher for academic purpose and is not funded by any school, institution or company.

Who has reviewed the study?

The research has been approved by the University of Greenwich Research Ethics Committee. The Head Teacher and Board of Governors of the school have also given their approval for the study.

Contact for Further Information:

Researcher contact details: Mary Acquah, Email: am710@gre.ac.uk

Supervisors: Mr William Goddard (w.d.goddard@gre.ac.uk) and Dr Priti Chopra (p.chopra@greenwich.ac.uk)

Appendix F2: Learner Participant Information Sheet



Project - Facilitating EAL Learners' Attainment Using Technology Enhanced Learning

My name is Mary Acquah and I am a research student at the University of Greenwich. I am doing a research study for my course on how Technology Enhanced Learning (TEL) can be used to improve the teaching of Mathematics, English and modern foreign languages to make your learning easier.



(Mary Acquah)

I would like you to take part in this study but before you decide, I want you to understand why the study is being done and what you will be doing. Please take time to read the following information carefully.



What is the reason for this study?

The reason for this study is find out how TEL can be used to teach, help you to learn and do better in your English, Mathematics and modern foreign language subjects.

Do I have to take part?



If you would like to take part in this study you will be a learner participant.



You can say yes or no. It is up to you whether you want to take part in this study or not.



If you do want to take part, please ask your teacher to help you read the information sheet.



You do not have to take part in this study if you do not want to.

If you want to take part you must:

- 1) Ask permission from your parents/guardians.
- 2) Read the information sheet.
- 3) Make sure you understand what you are about to do.
- 4) Give your permission by signing the attached form

What will I do in the study if I take part?

You will answer a questionnaire about how TEL is used in your subject. There will be 32 questions to answer.



I will sit in your Mathematics, English and modern foreign languages lessons to learn about how you use TEL in your lessons.



I will also look at your Mathematics, English and modern foreign languages reports to check any progress you may have made since the time TEL was used to teach you.



If for any reason (even after agreeing in writing) you no longer want to take part in the study you will be allowed to stop participating in the study.

The reason why information is being collected and how it will be used will be explained to you each time it is collected. By taking part in this study you will not be affected in anyway. The study will not affect your school work.

What are the possible benefits of taking part?



Your teachers will be able to improve the way they teach you using TEL. This could make learning Mathematics, English and modern foreign languages easier.

How will the information I give be kept?

The information I get from you will be kept private and safe. I will not tell your teachers, the school or your family what you have written.



Will what I say in this study be kept confidential?

Any information about you that you give for this study will be kept private unless you give permission for it to be shared. No one will know who you are. On the questionnaire, you will not be asked to write your name.



What will happen to the results of the study?

The results of this study will be used as part of my research study work for a degree.

You will be informed about the results of the study when it is complete.

Who is organising and funding the research?

This is a school based study for my degree. I am not being paid to do this study by any school or company.



Who has checked the study and given permission?

I have been given permission by the University of Greenwich Research Ethics Committee to do this study.

The Head Teacher and the Board of Governors of the school have also given their permission.

If you want to take part in the study, I would be very happy if you could sign the attached form and return it to the school.



You can ask to stop being part of the study at any time you feel you no longer want to continue.



Contact for Further Information: If you need any more information about this study you can contact me through my email address: am710@gre.ac.uk. You can also contact the lecturers supervising my study: Dr Priti Chopra, Email: p.chopra@greenwich.ac.uk and Mr. William Goddard, Email: w.d.goddard@gre.ac.uk

Thank you for taking the time to read this information sheet and for your kind consideration.



Appendix F3: Parent/Guardian Information Sheet



My name is Mary Acquah and I am a research student at the University of Greenwich. My research is being supervised by Dr. P. Chopra and Mr. B. Goddard from the School of Education, University of Greenwich who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details.

I am carrying out a research study to find out how Technology Enhanced Learning (TEL) is used to teach Mathematics, English and modern foreign languages and how it could make learning easier for English as an Additional Language (EAL) learners.

Your Role

If you agree to allow your son to take part in this study, you will become an authorising parent/guardian providing consent on behalf of your child allowing him to take part in this study.

Your son is being invited to take part in this research study. Before you decide whether or not he can take part, it is necessary for you to understand why the study is being done and what it will involve. Please take time to read the following information carefully.

Title of Research: Facilitating EAL Learners' Attainment Using Technology Enhanced Learning.

What is the purpose of the study?

The purpose of this study is to find out how TEL can be used to teach and help support EAL learners in their learning in order to improve their academic performance and exam results in Mathematics, English and modern foreign languages.

Does my son have to take part?

It is not compulsory for your son to take part in this study. His participation is voluntary.

Your permission is required prior to his participation.

Your permission must be given by signing the attached consent form.

How will my son be involved in this study?

Your son will answer a questionnaire of 32 questions. This questionnaire will be about how TEL is used to teach him in his lessons and how he learns with TEL. He will be observed, as a part of a class, in three of his lessons: Mathematics, English and modern foreign languages by the researcher (Mary Acquah). The observation will help the researcher to understand how he engages with and uses TEL to study these subjects. His test scores for the three subjects will also be looked at by the researcher to track his progress.

Your son can withdraw from the study at any time if he no longer wishes to take part. This is allowed even after he has agreed, and your permission has been given. There will be no negative repercussions for your son if he withdraws from this study at any stage. You may also withdraw your son from this study at any stage after giving your initial written permission.

The purpose of this study and the use of information that is collected will be explained to him before every stage of the information collection process.

Your son will always be made aware of information being gathered and what it is being used for at each stage of the study.

All precautions and consideration for your son's welfare will be taken to ensure that he is not stressed. Your son's interest will be protected in the study to ensure that he is safe and that the research does not interfere with his studies.

What are the possible benefits of taking part?

The results of the study could help teachers improve how TEL is used to support and teach EAL learners, including your son, in Mathematics, English and modern foreign languages. This may make learning these subjects easier. Teachers will also be able to know in which areas of the subjects mentioned TEL can be used to make lessons more understandable.

Findings from the study could serve as a guide to help teachers improve their teaching

methods for the benefit of learners. Results of the study will help teachers improve learning by finding ways to support learners in these subjects. Teachers will be able to know which areas of the subjects your son may be struggling with and help to support him in a more effective way.

Will what my son contributes in this study be kept confidential?

Information provided by your son and all other data used for this study will be kept strictly confidential and his details will not be disclosed to anybody inside or outside the school. Confidentiality will be maintained throughout the research study. His name will not be asked for or used on the research study questionnaires or in the lesson observation notes. Your son's name will not appear in any research study report. Information shared by him will be kept safe, secure and confidential and only used for the research study purpose for which it has been collected. In a situation where a disclosure in relation to child protection occurs, information will only be provided to the appropriate legal persons authorised to handle information given.

What will happen to the results of the research study?

The results of this study will be used strictly for academic purpose. No part of the study will be used for commercial gain. You will be informed about the outcome of the study when it is completed. The results of the study will be presented to the University of Greenwich as a research study. The findings of this study may be published, if necessary, to contribute to research on how to improve the use of TEL to support EAL learners effectively. This may inform future research and help to guide teachers when they teach EAL learners.

Who is organising and funding the research?

This study is being organised by the researcher (Mary Acquah) for academic purpose and is not funded by any school, institution or company.

Who has reviewed the study?

This research study has been approved by the University of Greenwich Research Ethics Committee. The Head Teacher and Board of Governors of the school have also approved this study.

Contact for Further Information:

Researcher: Mary Acquah, Email: am710@gre.ac.uk; Supervisors: Mr. William Goddard Email: w.d.goddard@gre.ac.uk and Dr. Priti Chopra Email: p.chopra@greenwich.ac.uk.

Appendix F4: Senior Leadership and Head of Department Information Sheet



My name is Mary Acquah and I am a research student at the University of Greenwich. My research is being supervised by Dr. P Chopra and Mr. W. Goddard from the School of Education, University of Greenwich who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details. I am undertaking a research study to examine how Technology Enhanced Learning (TEL) is used to teach Mathematics, English and modern foreign languages and how it could make learning easier for English as an Additional Language (EAL) learners.

Title of Research: Facilitating EAL Learners' Attainment Using Technology Enhanced Learning

What is the purpose of the study?

The purpose for this study is to find out under what circumstances TEL can be used in teaching to improve EAL learners' learning and exam results in Mathematics, English and modern foreign languages.

Who will be involved in the study?

A selected group of teachers (6 in total) from the Mathematics, modern foreign languages and English subject areas; 50 EAL learners in Year 10 and three heads of department will participate in the study. Participation will be voluntary. Study participants can opt out of the study at any given time.

How will the study be conducted?

Information will be collected from participants for the study using a questionnaire. Learner participants will answer a 32 item questionnaire and teacher participants will be invited to respond to a questionnaire with 10 questions. Questions will focus on how TEL is used in teaching EAL learners and its impact on learning.

The selected EAL learners will be observed in lessons by the researcher (Mary

Acquah) to understand how TEL is used in teaching to support EAL learners and under what conditions its usage may be effective. Teachers will be invited to participate in two semi-structured interviews at the start and end of the study. These will be 40 minutes long.

What are the possible benefits of the study?

Results of the study will be beneficial in highlighting the conditions under which the use of TEL to teach EAL learners is most effective. This may help in enhancing teaching/learning strategies to make the learning of English, Mathematics and modern foreign languages easier for EAL learners. Teachers will be able to identify and analyse further how EAL learners respond to the use of TEL in teaching and how it may help them in their learning. Findings from other subject areas and good practice will also be shared. This may contribute to improving practice. An understanding of conditions under which TEL can be used to help EAL learners will be shared. This may help to improve grades. On the whole, these findings will further serve as a guide to help improve teaching methods for the benefit of the learner. Findings from the study will be shared with the Senior Leadership Team, teachers and the school at the end of the study.

Will what research participants say in this study be kept confidential?

Information provided for this study will be kept strictly confidential and participants' identity will not be disclosed to anybody inside or outside the school. Names will not be asked for on the questionnaires. Research participants' identity will also be kept anonymous in research data collected from lesson observations and interviews. Collected data will be kept safe, secure and confidential and will only be used for the purpose for which it has been gathered. Participants can withdraw from the study at any time, whenever they feel unable to continue, even after giving their written permission. There will be no negative repercussions. Participants will not be misled to give information without their knowledge or approval. The purpose and use of research data will be explained to participants before it is gathered. Participants will always be made aware of research data being gathered and what it is being used for at every stage of the process. Necessary steps will be taken to ensure that they are not stressed and overburdened. Research participants' interest will be protected throughout this study to ensure that they are safe and that the study does not interfere with their work.

What will happen to the results of the research study?

The results of this study will be used strictly for academic purpose. No part of the study will be used for commercial gain. The results will be presented to the University of Greenwich as the researcher's doctoral thesis. The study will only be published, if required, to inform EAL and academic researchers. This study may serve as a stepping stone for future research and provide guidance to help teach EAL learners more effectively.

Who is organising and funding the research?

This research study is being organised by the researcher for academic purpose and is not funded by any school, institution or company.

Who has reviewed the study?

The research has been approved by the University of Greenwich Research Ethics Committee. The Head Teacher and Board of Governors of the school have also given their approval for the study.

Contact for Further Information:

Researcher contact details: Mary Acquah, Email: am710@gre.ac.uk

Supervisors: Mr William Goddard, Email: w.d.goddard@gre.ac.uk. and Dr. Priti Chopra, Email: p.chopra@greenwich.ac.uk

Appendix G – Consent Forms

Appendix G1: Learner Participant Consent Form

If I take part in Mary Acquah's study 'Exploring the Impact of Technology Enhanced Learning on EAL Learning in Mathematics, English and Modern Foreign Languages within a Secondary Education State School':

I understand that the study will involve me in answering a questionnaire.

I understand Mary will be observing me in three of my lessons.

My subject grades for Mathematics, English and modern foreign languages will be looked at by Mary to check my progress.

I understand that the any information I give about me will be private and confidential.



I understand that I can stop being a part of the study at any time.



If you understand the statements above and have ticked the boxes, you now need to decide whether you would like to take part in the project.

I have decided that I would like to take part in the project 'Exploring the Impact of Technology Enhanced Learning on EAL Learning in Mathematics, English and Modern Foreign Languages within a Secondary Education State School'

Please put a circle round No or Yes.



No

Yes

Signed.....
name.....

Please print your

Please return this form to the school as soon as possible

Appendix G2: Teacher Participant Consent Form



I have read the information sheet about this research study

I have had an opportunity to ask questions and discuss this research study

I have received satisfactory answers to all my questions

I have received enough information about this research study

I understand that I am free to withdraw from this research study:

At any time (until such date as this will no longer be possible, which I have been told)

Without giving a reason for withdrawing

If I am or intend to become a student at the University of Greenwich without affecting my future with the University

Without affecting any medical or nursing care I may be receiving.

I understand that my research data may be used for a further project in anonymous form, but I am able to opt out of this if I so wish, by ticking here.

I agree to take part in this study

Signed (participant)

Date

Name in block letters

Signature of researcher

Date

This project is supervised by: Mr. William Goddard and Dr. Priti Chopra who may be contacted at W.D.Goddard@gre.ac.uk and P.Chopra@gre.ac.uk.

Researcher's contact details (including telephone number and e-mail address):

Mary Acquah Email: am710@gre.ac.uk Tel: 0208 331 8058 (University of Greenwich)

Appendix G3: Parent/Guardian Consent Form



If the participant is under 18 this consent form needs to be completed by the parent / guardian / person acting in loco parentis.

I have read the information sheet about this research study	
I have had an opportunity to ask questions and discuss this research study	
I have received satisfactory answers to all my questions	
I have received enough information about this research study	
I understand that the research participant is free to withdraw from this research study:	
At any time (until such date as this will no longer be possible, which I have been told)	
Without giving a reason for withdrawing	
If the research participant is, or intends to become, a student at the University of Greenwich without affecting the participant's future with the University	
Without affecting any medical or nursing care the participant may be receiving.	
I understand that the participant's research data may be used for a further project in anonymous form, but I am able to opt out of this if I so wish, by ticking here. <input type="checkbox"/>	
I agree that my child/ the minor in my care can take part in this study <input type="checkbox"/>	
Name of participant who is under 18 years of age in block letters	
Signed (parent / guardian / other if the participant is under 18)	Date
Name in block letters	

Signature of researcher	Date
This project is supervised by: Mr. William Goddard and Dr. Priti Chopra who may be contacted at W.D.Goddard@gre.ac.uk and P.Chopra@gre.ac.uk.	
Researcher's contact details (including telephone number and e-mail address): Mary Acquah Email: am710@gre.ac.uk Tel: 0208 331 8058 (University of Greenwich)	

Appendix H: Research Letters of Invitation

Appendix H1: Parents and Guardians Research Letter of Consent



Dear Parent/ Guardian,

RE: Consent for EAL Research Study

My name is Mary Acquah and I am a Doctoral research student at the University of Greenwich. My research is being supervised by Dr. P. Chopra and Mr. W. Goddard from the School of Education who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details.

I am carrying out a research study to find out how TEL is used to teach Mathematics, English and modern foreign languages and how it may make learning easier for English as an Additional Language (EAL) learners. This study is solely for the purpose of completing academic research work but I anticipate that it will contribute to supporting learning in the classroom.

The study will be carried out under strict ethical guidelines. The identity of your son will be kept confidential and anonymous, and information shared will be protected under the Data Protection Act. The interest of your son will be safeguarded at all times. No pressure will be used at any point in time to obtain information or responses. This study will take place in an academic setting - in his school with the permission of the Head Teacher and the school authorities.

At the end of the study the findings will be shared with you. Please find attached an information sheet providing further details for this study and a consent form requesting your permission.

I would like to invite your son to participate in this study and would appreciate your

consent. Please register your approval and consent on behalf of your son by completing the attached consent form below this letter.

Thank you for agreeing to allow your son to be a part of this study.

Yours Sincerely,

Mary M. Acquah

Appendix H2: Teacher Invitation Letter



Dear Colleague,

RE: Invitation to Participate in EAL Research Study

My name is Mary Acquah and I am a research student at the University of Greenwich. My research is being supervised by Dr. P. Chopra and Mr. W. Goddard from the School of Education, University of Greenwich who can be contacted at P.Chopra@gre.ac.uk and W.D.Goddard@gre.ac.uk for further details.

I am carrying out a research study to examine how TEL is used to teach Mathematics, English and modern foreign languages and how it may make learning easier for English as an Additional Language (EAL) learners. This research study is solely for the purpose of completing academic research work.

The study will be carried out under strict ethical guidelines. Your identity will be kept confidential and anonymous, and information shared will be protected under the Data Protection Act. Your interest will be safeguarded at all times. No pressure will be used at any point in time to obtain information or responses. This study will take place in school with the permission of the Head Teacher and the Board of Governors.

At the end of the study the findings will be shared with you. Please find attached an information sheet providing further details for this study and a consent form requesting your permission. I would like to invite you to participate in this study and would appreciate your consent. Please register your approval and consent by completing the attached consent form below this letter.

Thank you.

Yours Sincerely,

Mary M. Acquah

Appendix H3: Student Invitation Letter



Dear Learner,

Invitation to Participate in an EAL Research Study

My name is Mary Acquah and I am a research student at the University of Greenwich.

I am carrying out a research study to find out how Technology Enhanced Learning (TEL) is used to teach Mathematics, English and modern foreign languages and how it may make learning easier for you. This study is only for academic purpose (my university course).

Your identity will be protected at all times, and information shared will not be passed onto anybody in or outside the school. It would be used only for the reasons given to you. Your interest will be protected at all times. No pressure will be used at any point in time to get information or responses. This study has been approved by the University and will take place in your school with the permission of the Head Teacher and the Board of Governors.

At the end of the study the findings will be shared with you. Please find attached an information sheet providing further details for this study and a consent form requesting your permission.

I would like to invite you to participate in this study and would appreciate your consent. Please register your approval and consent by completing the attached consent form below this letter.

Thank you for agreeing to participate in this study.

Yours Sincerely,

Mary M. Acquah

Appendix I – School Ofsted Report

Faith Valley School

Inspection report

Unique reference number	100459
Local authority	Islington
Inspection number	376401
Inspection dates	6–7 March 2012
Lead inspector	Alison Thomson

This inspection of the school was carried out under section 5 of the Education Act 2005.

Type of school		Comprehensive
School category		Voluntary aided
Age range of pupils		11–19
Gender of pupils		Boys
Gender of pupils in the sixth form	Mixed	
Number of pupils on the school roll	1023	
Of which, number on roll in the sixth form	182	
Appropriate authority		The governing body
Chair		Ashitey Ollennu

Head teacher A Tom Mannion
Date of previous school inspection 7–8 November 2006
School address Hornsey Lane
Highgate
London
N6 5LY
Telephone number 020 7263 1391
Fax number 020 7263 5963
Email address enquiries@sta.islington.sch.uk

Age group 11–19
Inspection date(s) 6–7 March 2012
Inspection number: 37640

Inspection report: 

Page 2 of 12

Introduction

Inspection team	Additional Inspector
Alison Thomson	Additional Inspector
Roger Garrett	Additional Inspector
Joan Lindsay	Additional Inspector
Ann Sydney	Additional Inspector

This inspection was carried out with two days' notice. There were no responses to the on-line questionnaire (Parent View) to use in the planning of the inspection. Inspectors observed 34 teachers teaching 36 lessons, of which 3 were joint observations with the senior leadership team. Meetings were held with members of the governing body, school leaders and students. The inspectors observed the school's work, including analyses of the students' work, and looked at a number of documents, including those relating to development planning, safeguarding and child protection, the monitoring of the quality of teaching, external views of the school and minutes of the governing body meetings. They also analysed questionnaires from 63 parents and carers, 149 students and 18 staff.

Information about the school

This school is a larger than average-sized secondary school. The proportion of students known to be eligible for free school meals is much higher than average. The proportion of students from ethnic minority groups, including those who do not have English as their first language, is also much higher than average. The proportion of students who are disabled or have special educational needs is average, although the proportion who have a statement of special educational needs is higher than average. The school is a specialist mathematics and information and communication technology (ICT) college. The school has met and exceeded government floor standards, which set the minimum expectations for attainment and progress. The school has gained many awards, including the Leading Aspect award for its successful promotion of a positive learning environment. The sixth form opened in September 2010 and is part of a local consortium.

Inspection grades: 1 is outstanding, 2 is good, 3 is satisfactory, and 4 is inadequate	
Please turn to the glossary for a description of the grades and inspection terms	

Inspection judgements

Overall effectiveness	1
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Achievement of pupils	1
Quality of teaching	1
Behaviour and safety of pupils	1
Leadership and management	1

Key findings

■ St Aloysius is an outstanding school and one that keeps getting better. The effectiveness of the recently opened sixth form is good. The following comment illustrates the high esteem in which the school is held by parents and carers, staff and students alike, 'The ethos for learning here is fantastic.'

□ Students' achievement is outstanding. Equality of opportunity is excellent. Students enter in Year 7 with below average attainment and leave at the end of Year 11 with attainment that is well above average. Progress of pupils who are disabled or have special educational needs and also those for whom English is not their first language needs to be addressed.

■ Teaching is outstanding. Teachers are very enthusiastic and use skilful questioning to challenge students and make them think. They regularly assess students' work most effectively and make it clear to them how they can improve it. However, occasionally the enthusiasm of the students to be involved in their own learning and progress is not always maximised.

■ Students behave extremely well and say that they feel very safe in school. They are very polite and welcoming and they look after each other well. They cooperate in a very mature way in lessons and this has a highly positive effect on their learning. The students rate behaviour highly and they are very proactive in the promotion of their own safety and that of others.

■ The leadership of teaching and the management of performance are highly successful. The school knows its strengths and the areas to develop further extremely well. Monitoring and evaluation of students' progress are carried out very rigorously and, along with the outstanding curriculum, ensure that the needs and interests of all students are met very effectively. The school provides many memorable experiences for its students, such as a visit to Beijing, successfully promoting their mature appreciation of spiritual, moral, social and cultural issues.

Inspection report: St Aloysius Catholic College, 6–7 March 2012 5 of 12

Inspection grades: 1 is outstanding, 2 is good, 3 is satisfactory, and 4 is inadequate

Please turn to the glossary for a description of the grades and inspection terms

What does the school need to do to improve further?

■ Maximise EAL students learning and progress in all lessons by:

- always sharing clear criteria for success with the students
 - Using Technology/ICT in learning.
 - Encouraging the students to reflect on how well they are learning
 - Teachers need to incorporate technology in teaching and learning, especially in the case of vulnerable groups (EAL and SEN).
 - Great care is to be taken to introduce TEL into as many EAL lessons as possible, ensuring excellent application of these skills.
 - EAL and SEN learners must receive the support they need to do as well as their peers.
 - Teachers need to adjust materials and activities incorporating TEL activities and modes of instruction so that they match students' needs.
 - Use high levels of scaffolding using TEL and appropriate pedagogies to enable learners of varying EAL abilities to make outstanding progress.

Main report

Achievement of pupils

Students start in Year 7 with attainment that is generally below average. Excellent induction procedures, including mentoring by older boys, help them to settle quickly and get a very confident start. Progress throughout school is outstanding, particularly in Years 10 and 11. By the time the students leave at the end of Year 11 their attainment is well above average, especially so in mathematics, one of the school's specialist subjects. All groups of students make outstanding progress throughout the school. In previous years, attainment of the most-able students has not always been as high as that of other students. The school's data of current progress and inspection evidence confirm this. Students rise particularly well to challenges, such as in a Year 11 history lesson, where they made outstanding progress, maturely discussing how the Soviet invasion of Afghanistan changed the Cold War.

Parents and carers strongly agree in the questionnaires that their children are achieving very well. The school's data show that progress has steadily improved over the past seven years. This is helped greatly by the school's rigorous monitoring of progress, timely interventions and extensive preparation for examinations. It is a testament both to the boys and to their parents and carers that attendance at Saturday school, sometimes used for revision, is so high. Students are very respectful of each other and encourage each other to learn well. This was exemplified well in a Year 11

mathematics lesson on probability. Here, they listened attentively to each other giving explanations on how to calculate probabilities by drawing tree diagrams. Great care is taken to introduce literacy, numeracy and ICT into as many lessons as possible, ensuring that the application of these skills is excellent. Disabled students and those who have special educational needs do as well as their peers, because teachers make suitable adjustments to materials and activities so that they match students' needs. High levels of staffing enable students of varying abilities to make outstanding progress, as a result of highly effective levels of care and one-to-one support they receive from teaching assistants. Those students who are new to learning English make outstanding progress as a result of various strategies, such as staff providing practical activities using visual clues for word recognition.

Appendix J: GCSE Trend Analysis

	EAL Learners			First Language English Speakers			Total
	English	Maths	MFL	English	Maths	MFL	
2010	44%	49%	34%	56%	51%	56%	100%
2011	23%	45%	41%	77%	55%	59%	100%
2012	48%	50%	47%	52%	50%	53%	100%
2013	31%	47%	32%	69%	53%	68%	100%
2014	36%	43%	42%	54%	57%	54%	100%
2015	37%	50%	45%	63%	50%	55%	100%

Appendix K: Data Analysis

Appendix K1: Data Analysis -Learners

FREQUENCY DISTRIBUTION TABLES:

A **frequency distribution** is a list, table or graph that displays the frequency of various outcomes in a sample. Each entry in the table contains the frequency or count of the occurrences of values within a particular group or interval, and in this way, the table summarizes the distribution of values in the sample.

Some of the graphs that can be used with frequency distributions are histograms, line charts, bar charts and pie charts. Frequency distributions are used for both qualitative and quantitative data.

Depending upon the nature of the questionnaire, frequency distribution tables can be successfully applied to get useful results and to satisfy the research questions as it helps in maintaining proper tabular records about the opinions of the respective

respondents i.e. learners and the teachers.

Q1: Age

Age

Age group	Frequency	Percent	Valid Percent	Cumulative Percent
12 years	5	10.0	10.0	10.0
13 years	9	18.0	18.0	28.0
14 years	9	18.0	18.0	46.0
15 years	7	14.0	14.0	60.0
16 years	5	10.0	10.0	70.0
17 years	5	10.0	10.0	80.0
18 years	7	14.0	14.0	94.0
19 years	3	6.0	6.0	100.0
Total	50	100.0	100.0	

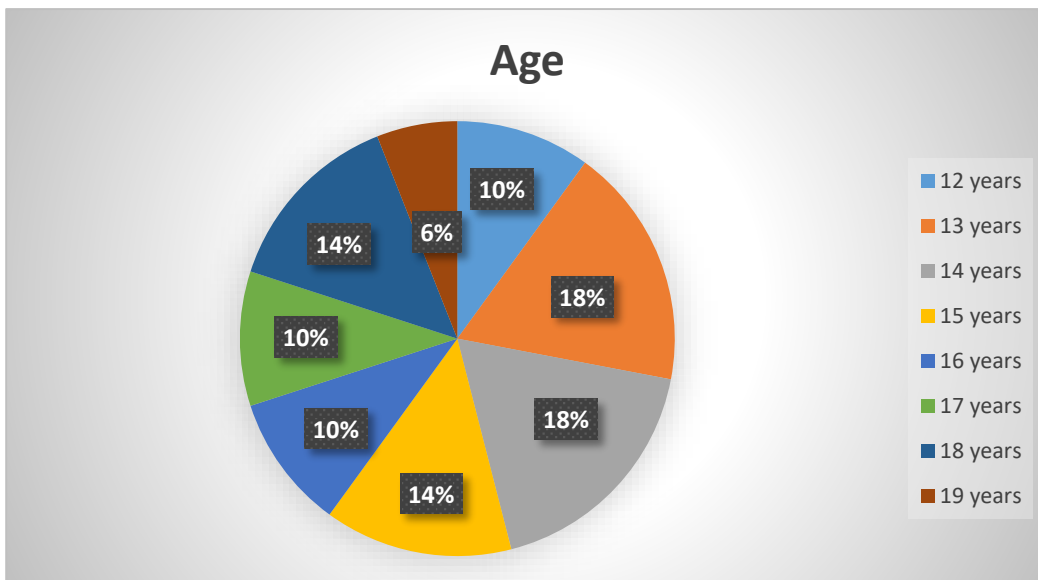


Table 6: Age

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (18%) are 13 years and 14 years old and very few learners (6%) are 19 years old.

Q2: Length of time you have lived in England

Years Lived in England

Length (in years)	Frequency	Percent	Valid Percent	Cumulative Percent
1 - 5 years	17	34.0	34.0	34.0
6 - 10 years	21	42.0	42.0	76.0
More than 10 years	12	24.0	24.0	100.0
Total	50	100.0	100.0	

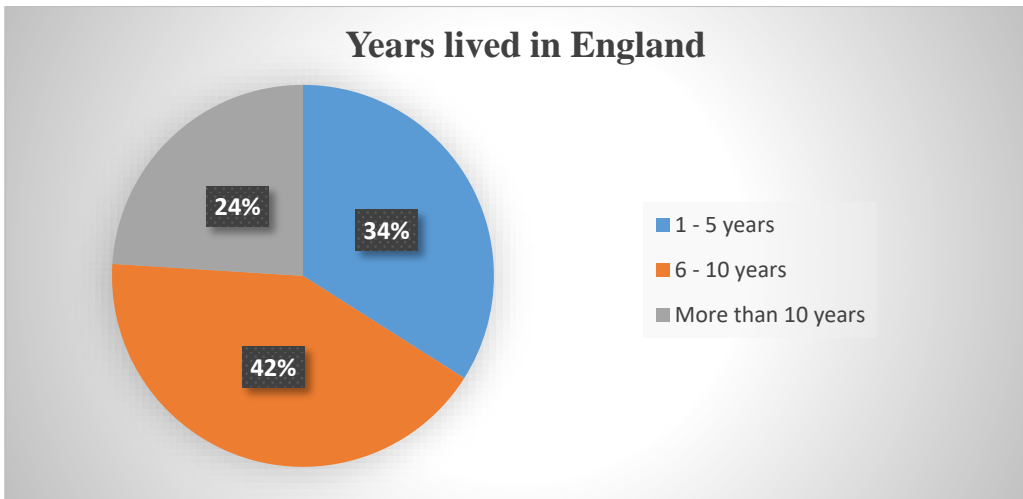


Table 7: Years lived in England

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (42%) are living in England from 6 - 10 years and very few learners (24%) are living in England from more than 10 years.

Q3: Nationality

Nationality

Nationality	Frequency	Percent	Valid Percent	Cumulative Percent
British	3	6.0	6.0	6.0
Portugal	9	18.0	18.0	24.0
Scottish	10	20.0	20.0	44.0
French	12	24.0	24.0	68.0
Irish	11	22.0	22.0	90.0
Others	5	10.0	10.0	100.0
Total	50	100.0	100.0	

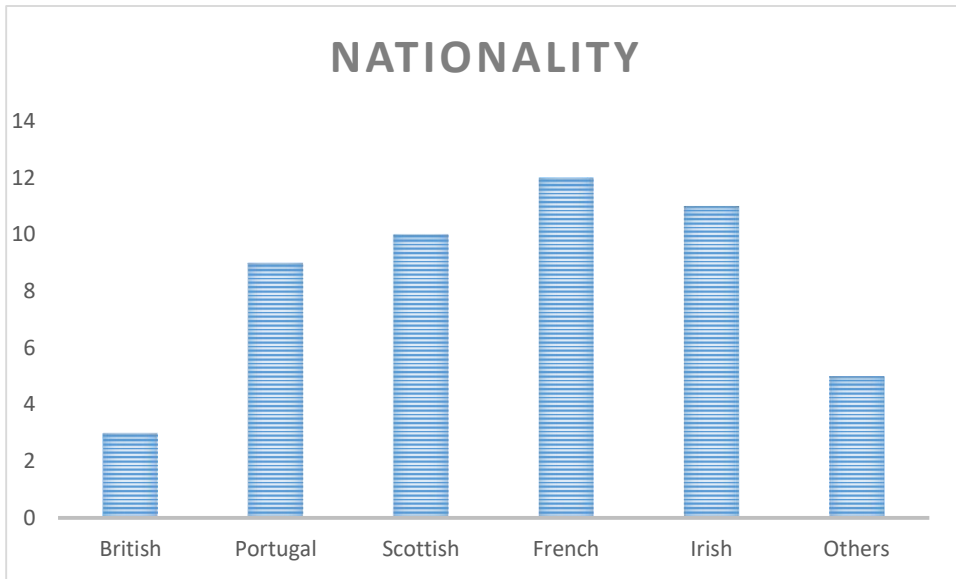


Table 8: Nationality

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (22%) are Irish and very few learners (6%) are British.

Q4: Languages

Languages

Languages	Frequency	Percent	Valid Percent	Cumulative Percent
English	7	14.0	14.0	14.0
Welsh	9	18.0	18.0	32.0
Portugues	13	26.0	26.0	58.0
Scots	9	18.0	18.0	76.0

French	7	14.0	14.0	90.0
Others	5	10.0	10.0	100.0
Total	50	100.0	100.0	

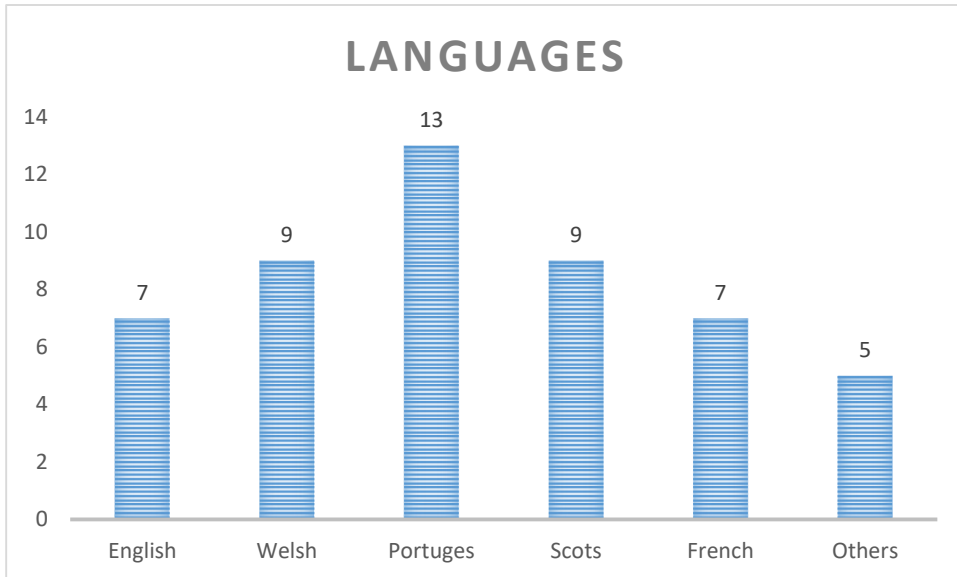


Table 9: Languages spoken

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (26%) speak Portuges and very few learners (10%) speak other language.

Q5: In which lessons is TEL used?

In which lessons is TEL used?

Subjects	Frequency	Percent	Valid Percent	Cumulative Percent
Mathematics	7	14.0	14.0	14.0
English	10	20.0	20.0	34.0

Science	16	32.0	32.0	66.0
MFL	14	28.0	28.0	94.0
Others	3	6.0	6.0	100.0
Total	50	100.0	100.0	

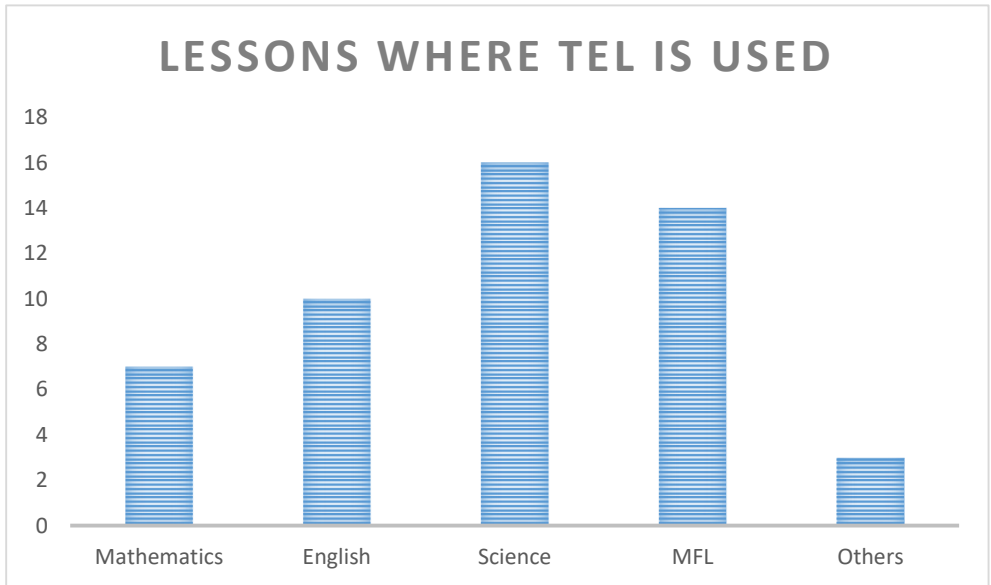


Table 10: In which lessons is TEL used?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (32%) think that TEL can be used in Science and very few learners (6%) think that TEL can be used in other subjects also.

Q6: What types of TEL are used in your lessons?

What types of TEL are used in your lessons?

Types of TEL	Frequency	Percent	Valid Percent	Cumulative Percent

Interactive whiteboards	2	4.0	4.0	4.0
Overhead projectors	8	16.0	16.0	20.0
Computers	5	10.0	10.0	30.0
Internet	10	20.0	20.0	50.0
Web based teaching and learning resources	6	12.0	12.0	62.0
Camcorders/Digital Cameras	4	8.0	8.0	70.0
Scanners	7	14.0	14.0	84.0
Printers	6	12.0	12.0	96.0
Others	2	4.0	4.0	100.0
Total	50	100.0	100.0	

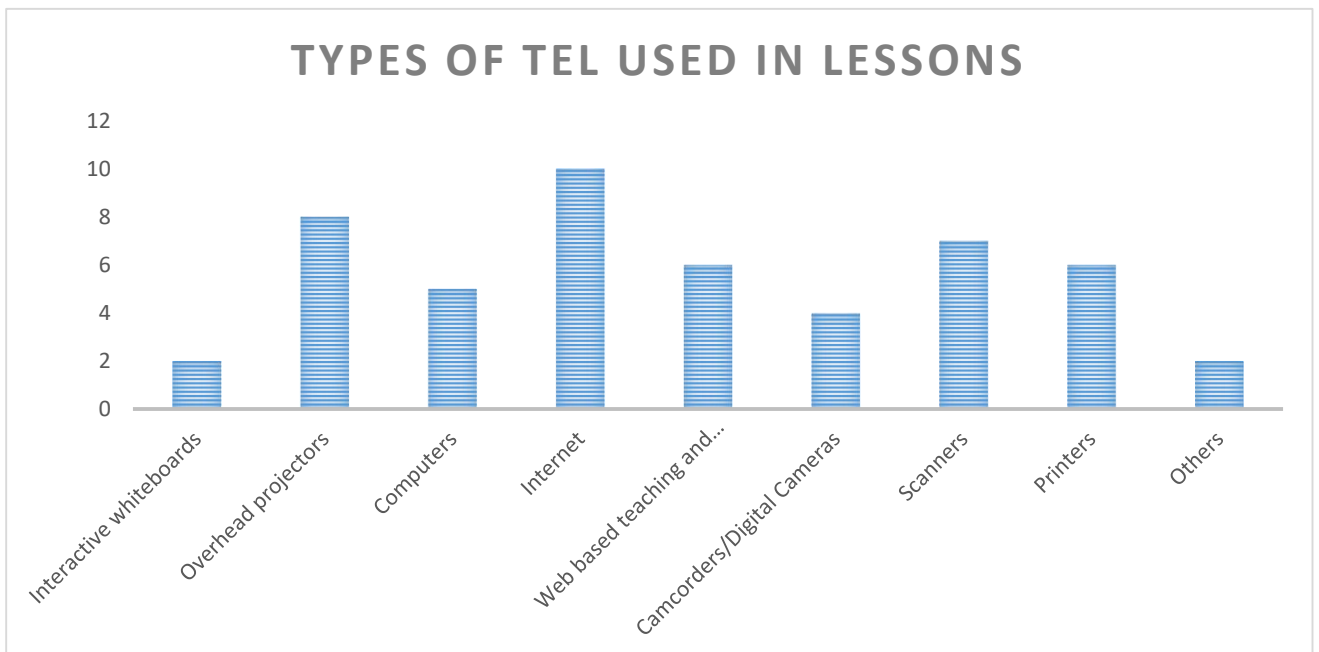


Table 11: What types of TEL are used in your lessons?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (20%)

think that internet can be used as a Technology Enhanced Learning practice in doing lessons and very few learners (4%) think that interactive white boards along with other resources can be used as a Technology Enhanced Learning practice in doing lessons.

Q7: How is TEL used in lessons?

How is TEL used in lessons?

TEL used	Frequency	Percent	Valid Percent	Cumulative Percent
In explaining work/tasks	4	8.0	8.0	8.0
In explaining ideas/concepts	9	18.0	18.0	26.0
For class work/tasks	9	18.0	18.0	44.0
As extra learning practice for what has been taught	8	16.0	16.0	60.0
For homework tasks	9	18.0	18.0	78.0
Other	11	22.0	22.0	100.0
Total	50	100.0	100.0	

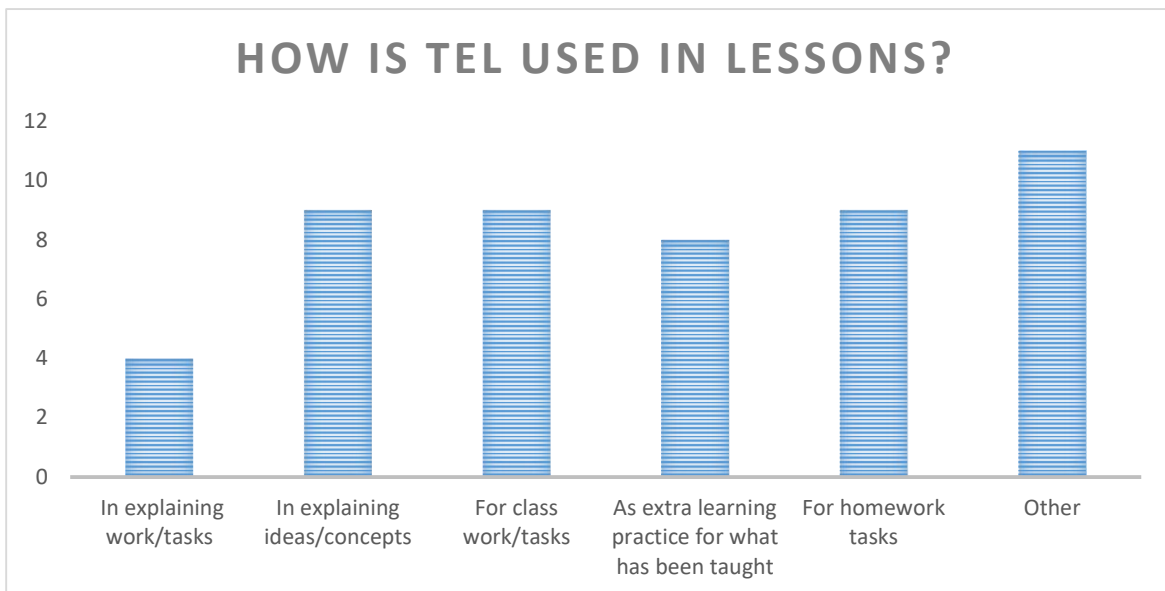


Table 12: How is TEL used in lessons?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (22%) think that Technology Enhanced Learning is used for other tasks more and very few learners (8%) think that Technology Enhanced Learning is used in explaining work/tasks as per the lessons.

Q8: Do you like the idea of TEL being used in your lessons?

Do you like the idea of TEL being used in your lessons?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	36	72.0	72.0	72.0
No	14	28.0	28.0	100.0
Total	50	100.0	100.0	

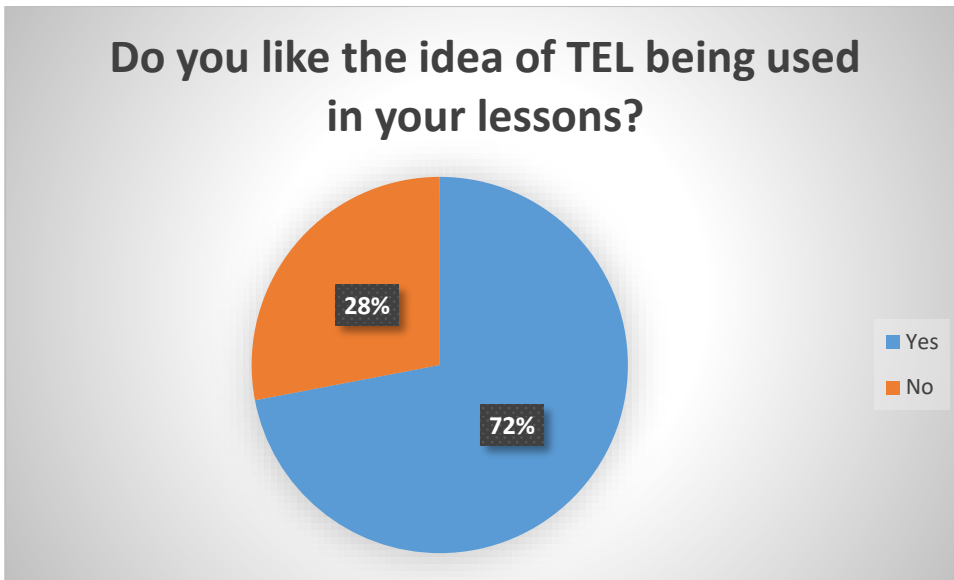


Table 13: Do you like the idea of TEL being used in your lessons?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (72%) like the idea of Technology Enhanced Learning being used in their lessons and very few learners (28%) do not like the idea of Technology Enhanced Learning being used in their lessons.

IMPACT OF TEL IN TEACHING AND LEARNING ENGLISH, MATHS AND MODERN FOREIGN LANGUAGES

Q9: Has the use of TEL helped improve your grades in Mathematics?

Has the use of TEL helped improve your grades in Mathematics?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	20	40.0	40.0	40.0

Yes	30	60.0	60.0	100.0
Total	50	100.0	100.0	

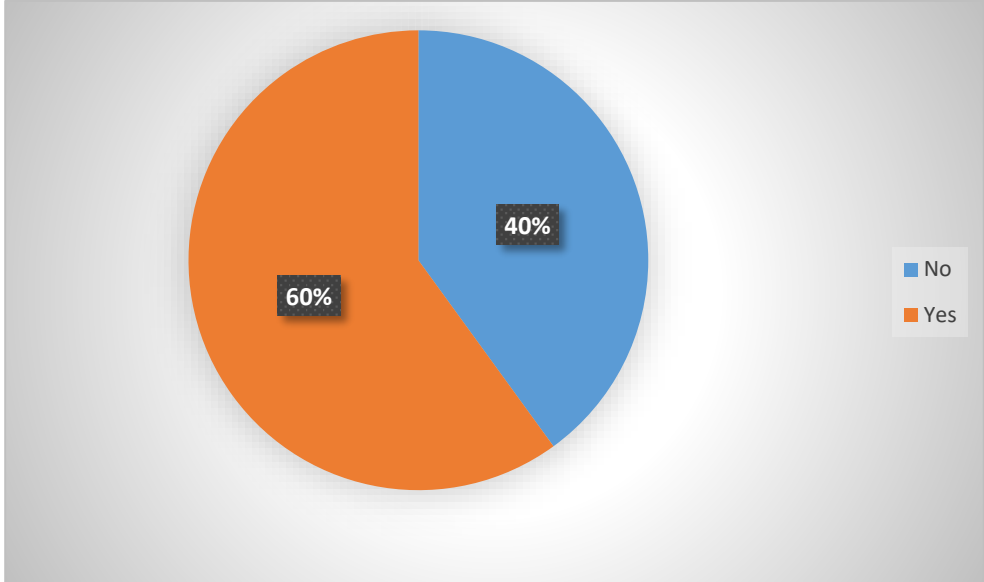


Table 14: Has the use of TEL helped improve your grades in Mathematics?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (60%) think that the use of Technology Enhanced Learning helped improve their grades in Mathematics and very few learners (40%) do not think that the use of Technology Enhanced Learning helped improve their grades in Mathematics.

Q10: How has it helped?

Has TEL helped in mathematics?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
To understand what is taught	5	10.0	10.0	10.0
Made lessons more interesting	11	22.0	22.0	32.0

Made Mathematics more practical	11	22.0	22.0	54.0
I am able to work on my own using Mathematics study sites	7	14.0	14.0	68.0
Do more Mathematics homework	9	18.0	18.0	86.0
Other	7	14.0	14.0	100.0
Total	50	100.0	100.0	

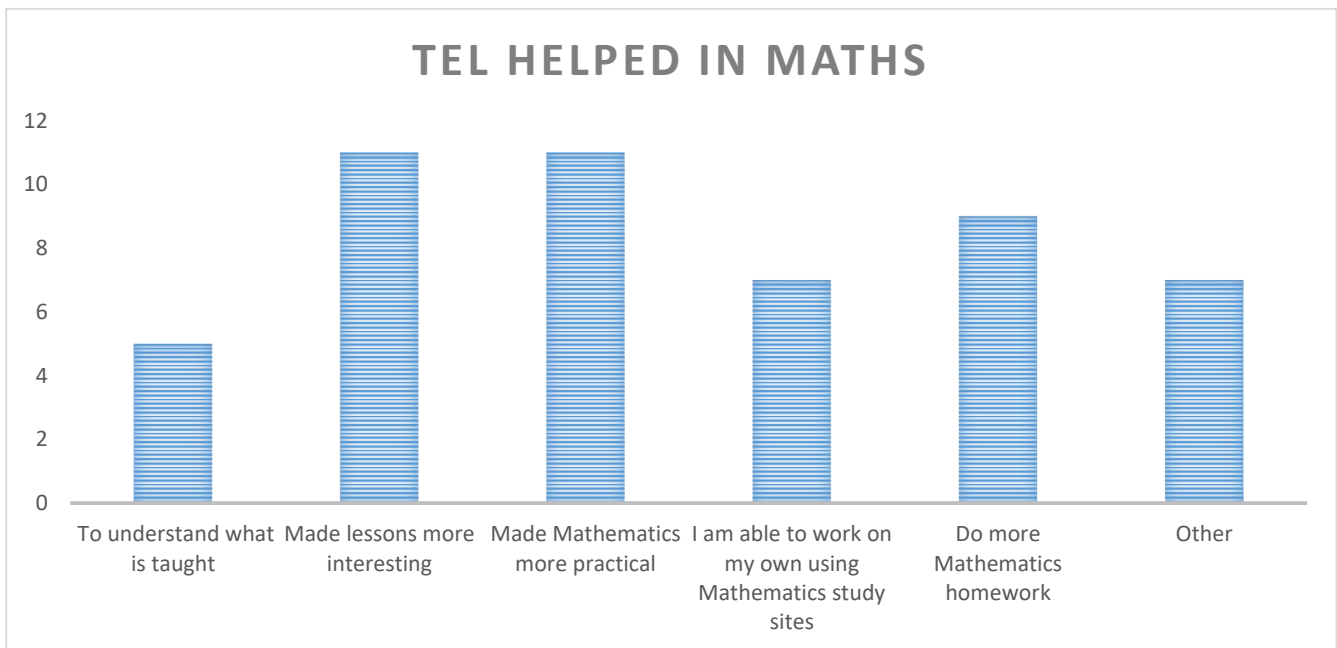


Table 15: Has TEL helped in mathematics?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (22%) think that the use of TEL made mathematics lessons more interesting and practical and very few learners (10%) think that the use of TEL helped them to understand what is taught.

Q11: Has the use of TEL helped you get good grades in English?

Has the use of TEL helped you get good grades in English?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	21	42.0	42.0	42.0
Yes	29	58.0	58.0	100.0
Total	50	100.0	100.0	

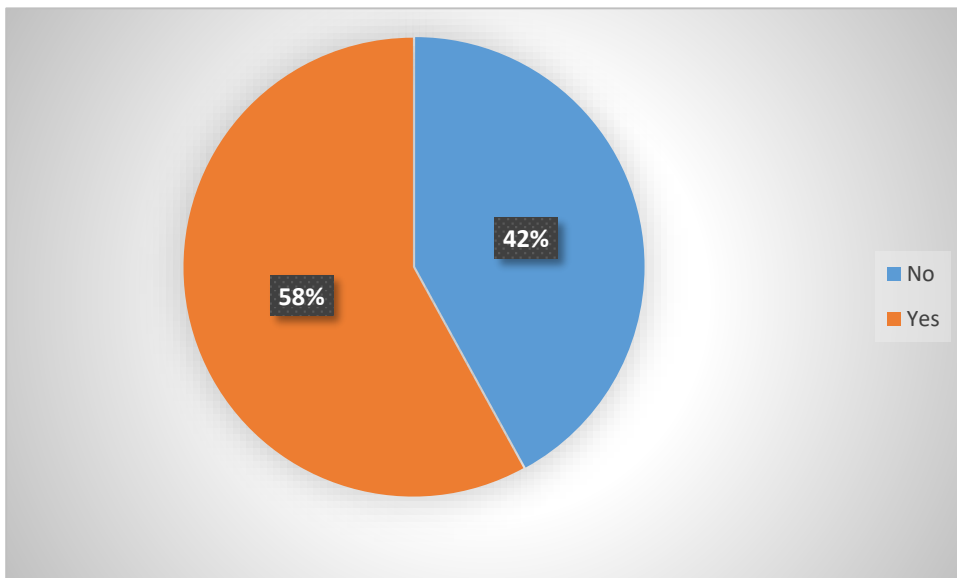


Table 16: Has the use of TEL helped you get good grades in English?

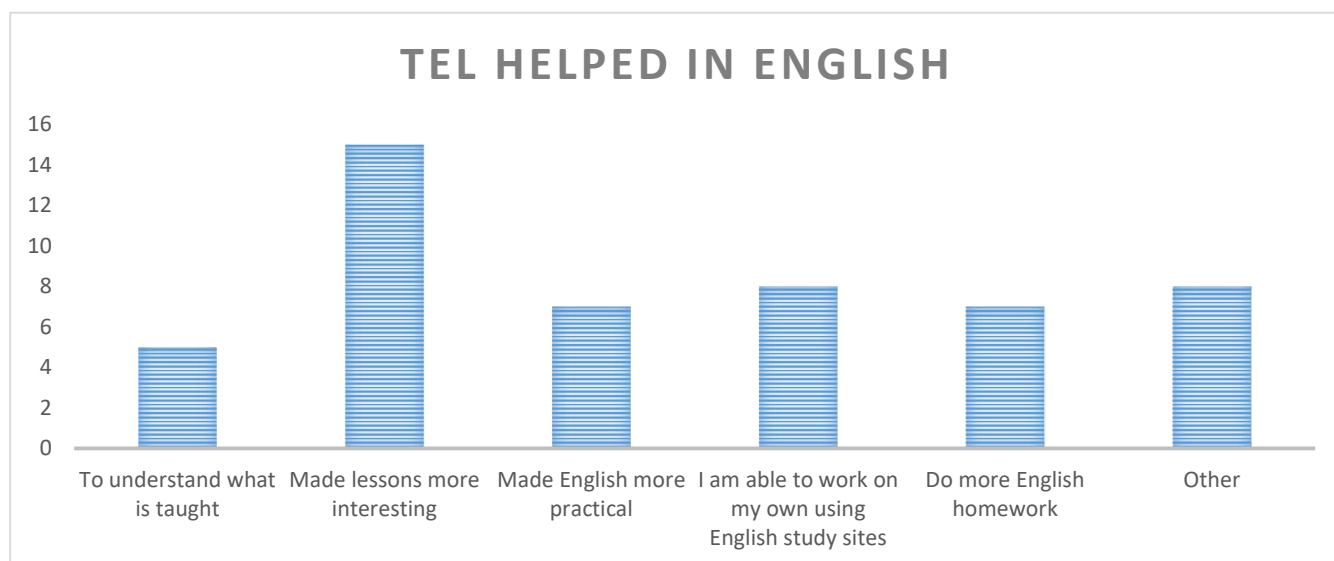
INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (58%) think that the use of Technology Enhanced Learning helped improve their grades in English and very few learners (42%) do not think that the use of Technology Enhanced Learning helped improve their grades in English.

Q12: How has it helped?

Has TEL helped in English?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
To understand what is taught	5	10.0	10.0	10.0
Made lessons more interesting	15	30.0	30.0	40.0
Made English more practical	7	14.0	14.0	54.0
I am able to work on my own using English study sites	8	16.0	16.0	70.0
Do more English homework	7	14.0	14.0	84.0
Other	8	16.0	16.0	100.0
Total	50	100.0	100.0	



INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (30%) think that the use of TEL made English lessons more interesting and practical and very few learners (10%) think that the use of TEL helped them to understand what is taught.

Q13: Has the use of TEL helped you get good grades in modern foreign languages?

Has the use of TEL helped you get good grades in MFL?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	29	58.0	58.0	58.0
No	21	42.0	42.0	100.0
Total	50	100.0	100.0	

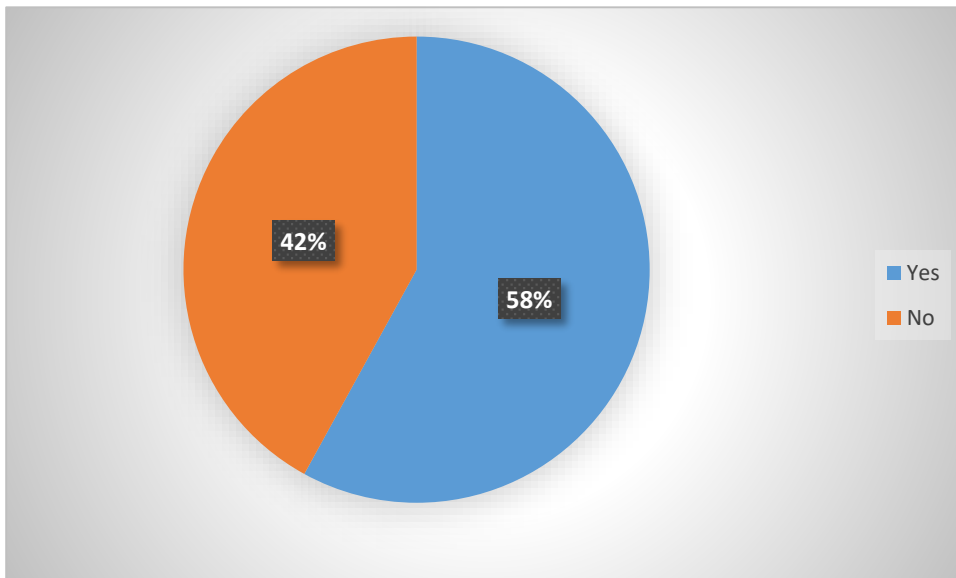


Table 17: Has the use of TEL helped you get good grades in MFL?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (58%) think that the use of Technology Enhanced Learning helped improve their grades in Modern Foreign Languages and very few learners (42%) do not think that the use of Technology Enhanced Learning helped improve their grades in Modern Foreign Languages.

Q14: How has it helped?

Has TEL helped in MFL?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
To understand what is taught	8	16.0	16.0	16.0
Made lessons more interesting	12	24.0	24.0	40.0
Made MFL more practical	15	30.0	30.0	70.0
I am able to work on my own using MFL study sites	11	22.0	22.0	92.0
Others	4	8.0	8.0	100.0
Total	50	100.0	100.0	

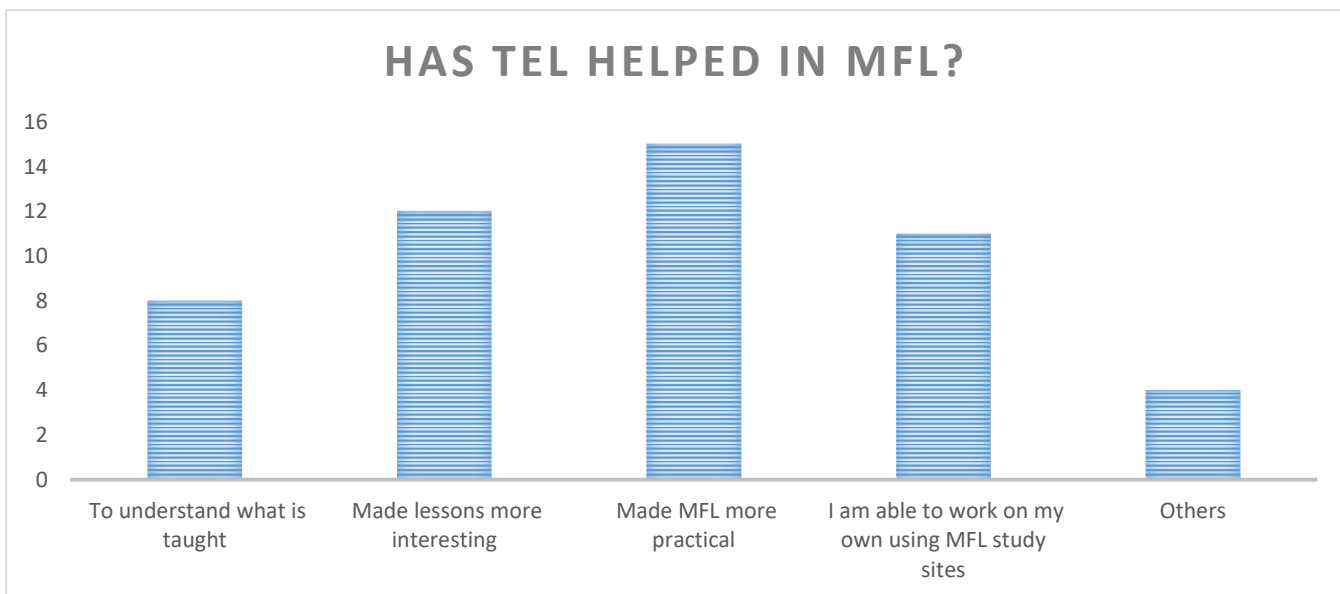


Table 18: Has TEL helped in MFL?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (30%) think that the use of TEL made modern foreign language lessons more interesting and

practical and very few learners (8%) think that the use of TEL made other tasks possible for modern foreign languages.

Hence from the above results concluded from respective frequency tables and graphical presentations, we can conclude that there is a good impact of Technology Enhanced Learning strategies in learning Mathematics, English and Modern Foreign Languages.

Research question: How do learners access / measure the benefits of Technology Enhanced Learning practices?

The question basically tries to examine the benefits of Technology Enhanced Learning practices from the perspective of learners.

Q15: Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) helped you understand your subject better?

Has the use of TEL helped you understand your subject better?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	27	54.0	54.0	54.0
No	23	46.0	46.0	100.0
Total	50	100.0	100.0	

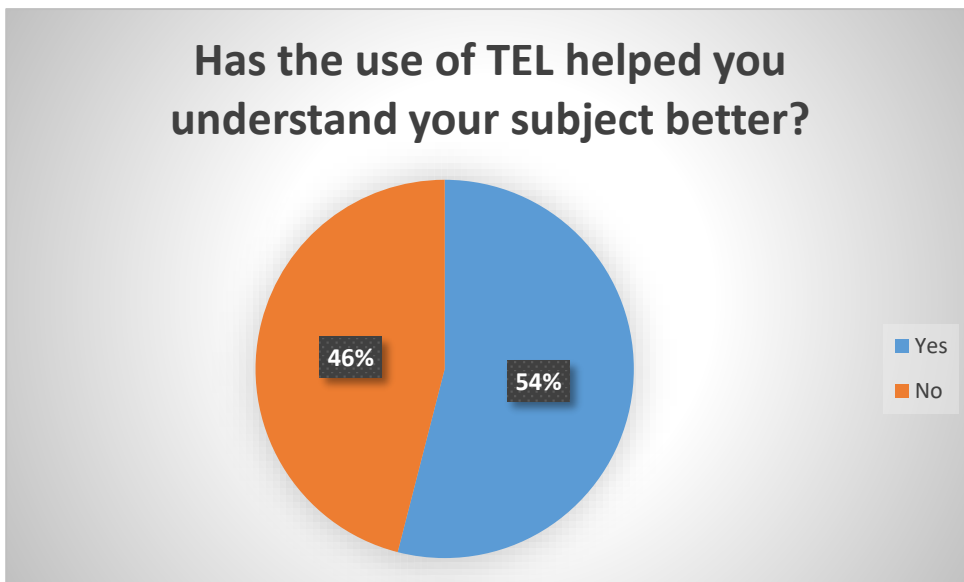


Table 19: Has the use of TEL helped you understand your subject better?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (54%) think that the use of TEL helped in better understanding of the subject and very few learners (46%) do not think that the use of TEL helped in better understanding of the subject.

Q16: Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM resources) made your homework easier?

Has the use of TEL made your homework easier?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid no	27	54.0	54.0	54.0
yes	23	46.0	46.0	100.0
Total	50	100.0	100.0	

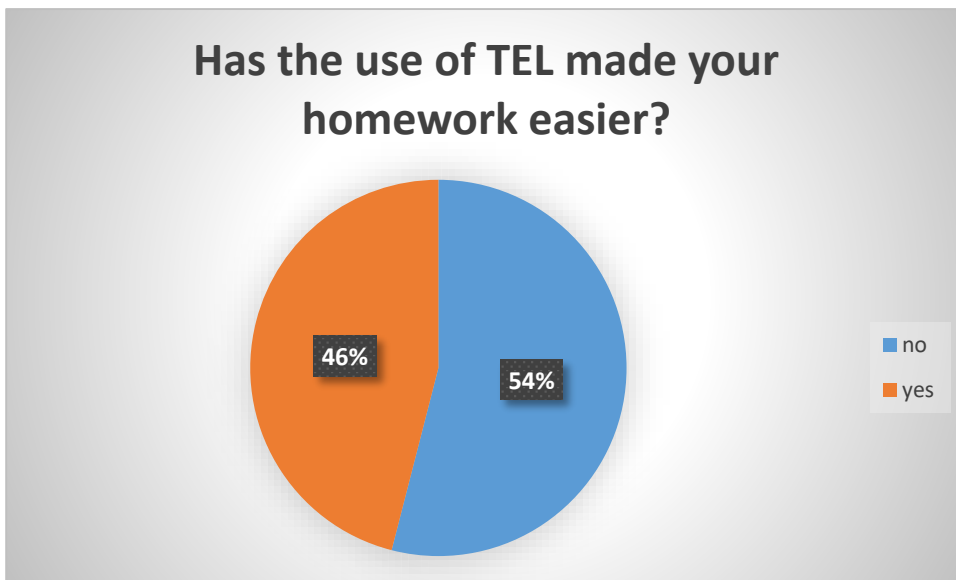


Table 20: Has the use of TEL made your homework easier?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (54%) learners think that the use of TEL made homework easier and very few learners (46%) do not think that the use of TEL made homework easier.

Q17: Has the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) resources made your exams easier?

Has the use of TEL resources made your exams easier?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	33	66.0	66.0	66.0
No	17	34.0	34.0	100.0
Total	50	100.0	100.0	

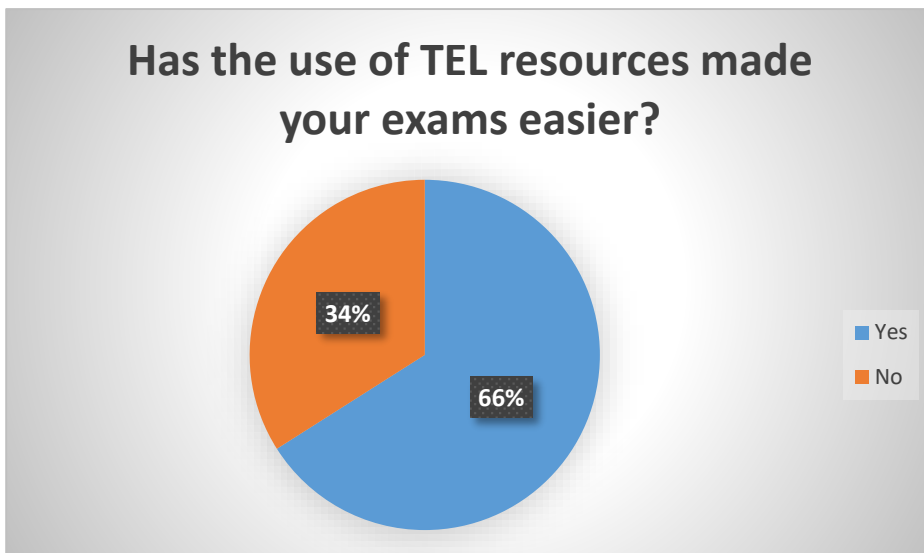


Table 21: Has the use of TEL resources made your exams easier?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (66%) think that the use of TEL made exams easier and very few learners (34%) do not think that the use of TEL made exams easier.

Q18: Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) help you study on your own?

Does the use of TEL help you study on your own?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	29	58.0	58.0	58.0
No	21	42.0	42.0	100.0
Total	50	100.0	100.0	

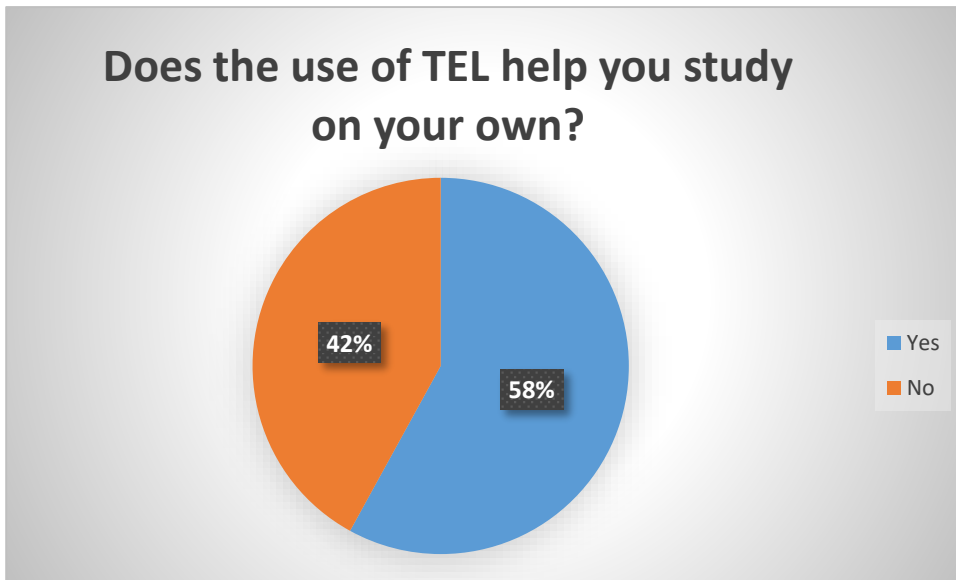


Table 22: Does the use of TEL help you study on your own?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (58%) think that the use of TEL helped in self-study and very few respondents (42%) do not think that the use of TEL helped in self-study.

Q19: Does the use of TEL learning resources help you study better?

Does the use of TEL learning resources help you study better?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	17	34.0	34.0	34.0
Yes	33	66.0	66.0	100.0
Total	50	100.0	100.0	

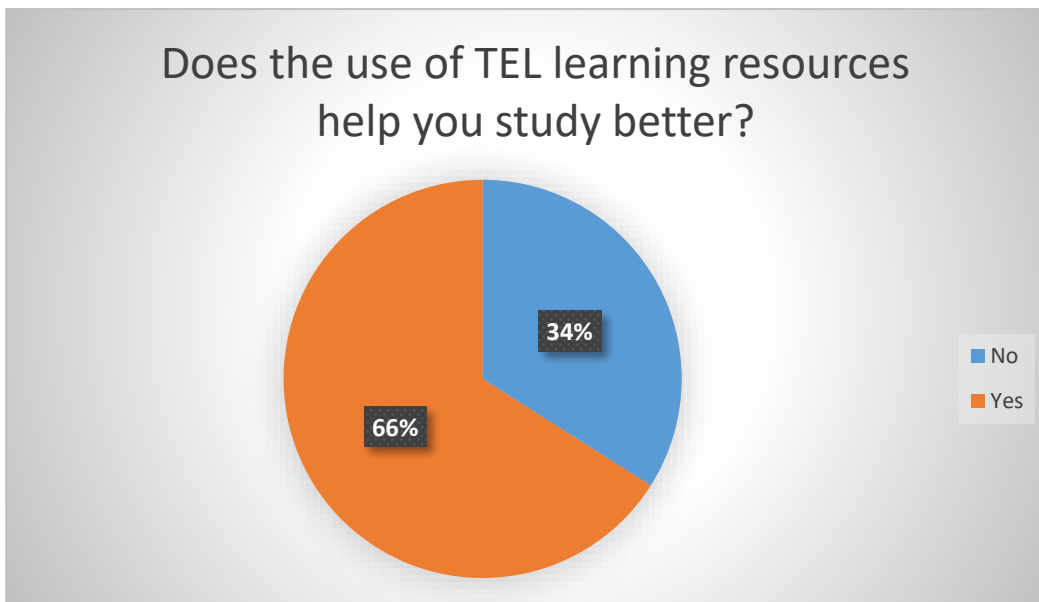


Table 23: Does the use of TEL learning resources help you study better?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (66%) think that the use of TEL learning sources help in studying better and very few learners (34%) do not think that the use of TEL learning sources help in studying better.

Q20: Does the use of TEL learning resources help you study longer?

Does the use of TEL learning resources help you study longer?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	23	46.0	46.0	46.0
Yes	27	54.0	54.0	100.0
Total	50	100.0	100.0	

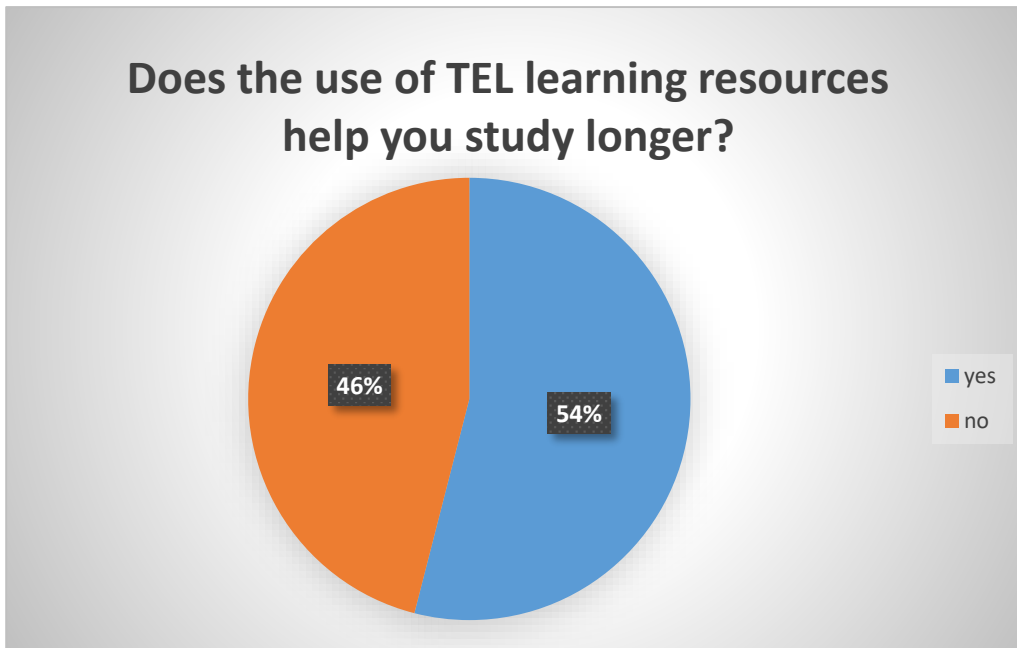


Table 24; Does the use of TEL learning resources help you study longer?

INTERPRETATION:

The pie chart shows that -

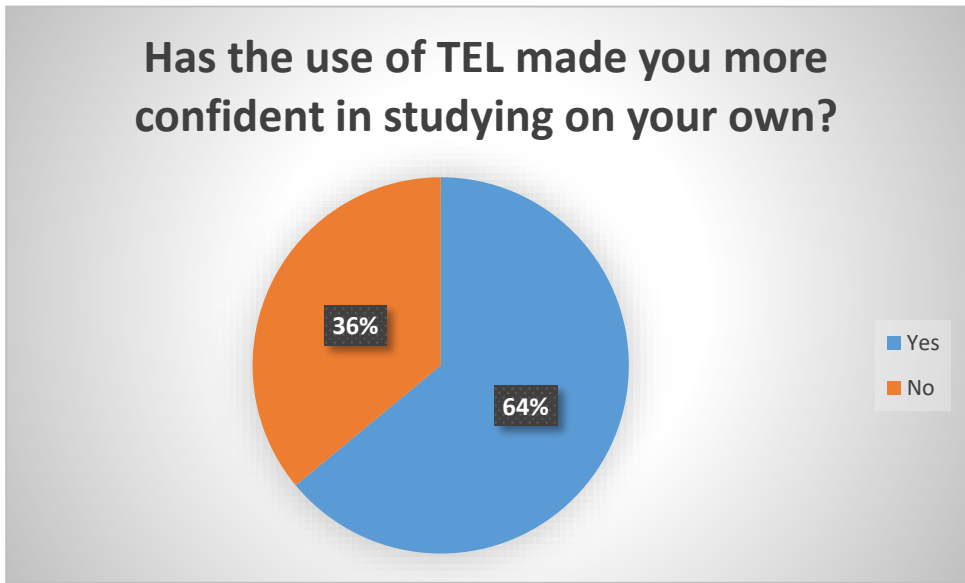
- ✧ 54% learners think that the use of TEL learning sources help in studying longer.
- ✧ 46% learners do not think that the use of TEL learning sources help in studying longer.

Q21: Has the use of TEL made you more confident in studying on your own?

Has the use of TEL made you more confident in studying on your own?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	32	64.0	64.0	64.0
No	18	36.0	36.0	100.0

Total	50	100.0	100.0	
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INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (64%) think that the use of TEL builds more confidence for self-study and very few learners (36%) do not think that the use of TEL builds more confidence for self-study.

Q22: Does the use of TEL (internet sites, ICT, web based on line interactive resources and CD ROM) assist you to do homework without help?

Does the use of TEL assist you to do homework without help?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	28	56.0	56.0	56.0
No	22	44.0	44.0	100.0
Total	50	100.0	100.0	

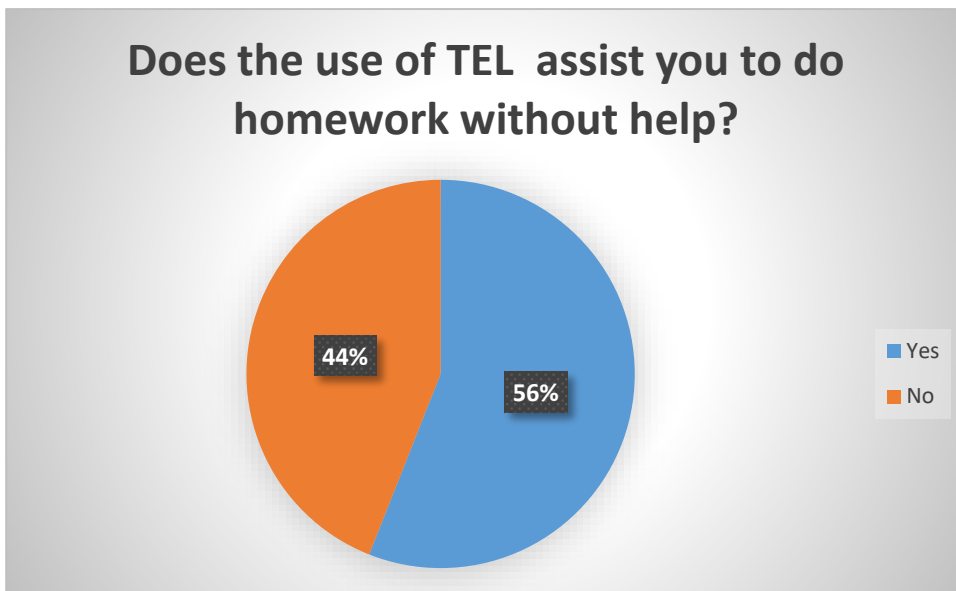


Table 25: Does the use of TEL assist you to do homework without help?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (56%) think that the use of TEL assist in doing homework without any help and very few learners (44%) learners do not think that the use of TEL assist in doing homework without any help.

Q23: Has the use of TEL helped you to improve your reading?

Has the use of TEL helped you to improve your reading?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	12	24.0	24.0	24.0
	Yes	25	50.0	50.0	74.0
	Not sure	13	26.0	26.0	100.0
	Total	50	100.0	100.0	

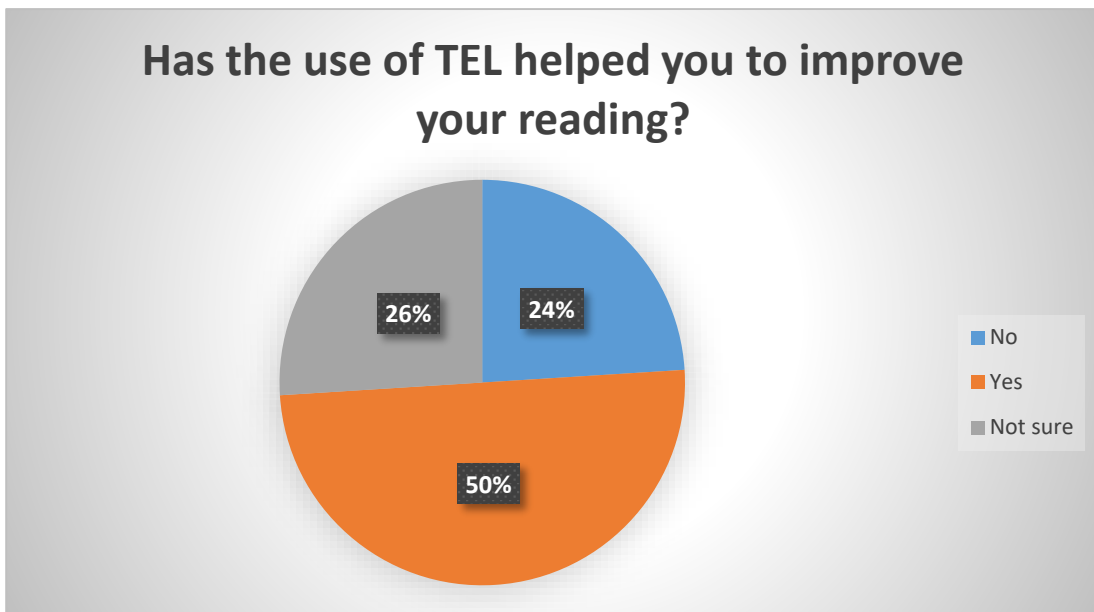


Table 26: Has the use of TEL helped you to improve your reading?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum

Q24: Has the use of TEL helped you to improve your language learning?

Has the use of TEL helped you to improve your language learning?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	17	34.0	34.0	34.0
	Yes	26	52.0	52.0	86.0
	Not sure	7	14.0	14.0	100.0
	Total	50	100.0	100.0	

Has the use of TEL helped you to improve your language learning?

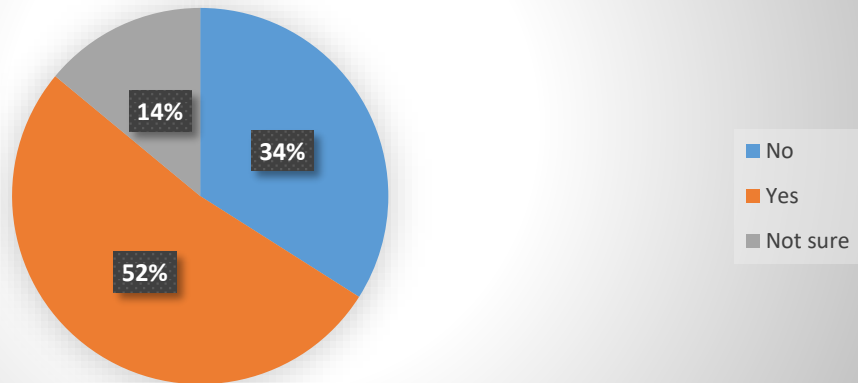


Table 27: Has the use of TEL helped you to improve your language learning?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (52%) think that the use of TEL helped in improving language learning and very few learners (14%) are not sure that the use of TEL helped in improving language learning.

Q25: Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better?

Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	11	22.0	22.0	22.0
Yes	21	42.0	42.0	64.0
Not sure	18	36.0	36.0	100.0
Total	50	100.0	100.0	

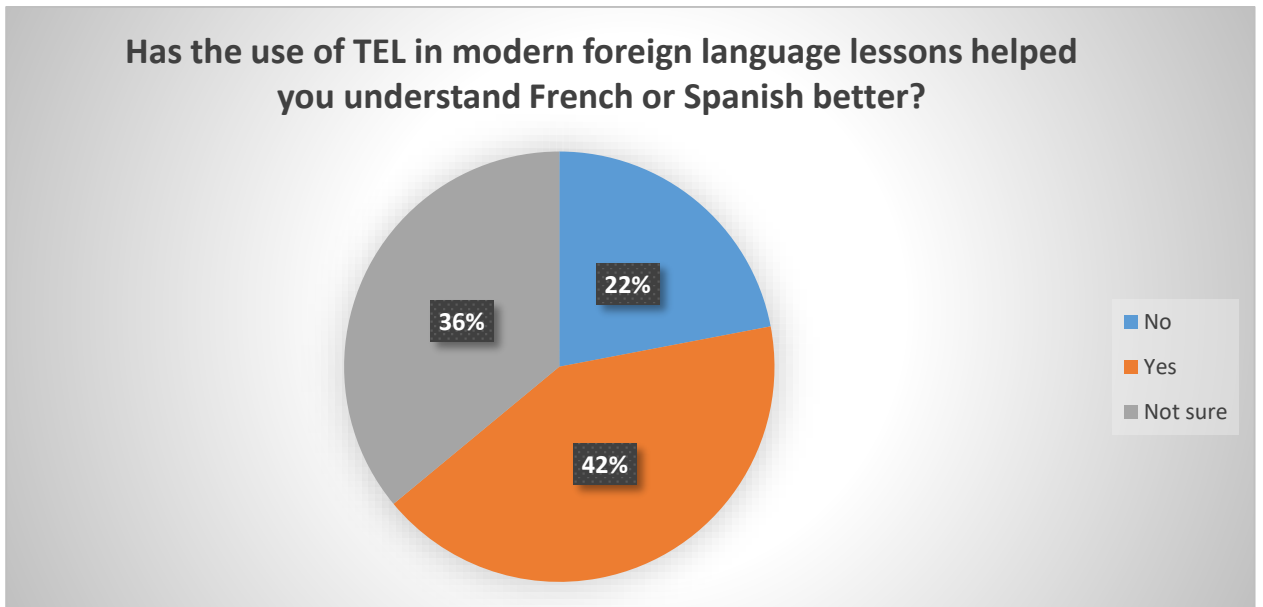


Table 28: Has the use of TEL in modern foreign language lessons helped you understand French or Spanish better?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (42%) think that the use of TEL helped in understanding modern foreign languages. And very few learners (22%) do not think that the use of TEL helped in understanding modern foreign languages.

Q26: Has the use of TEL strategies helped to improve your mathematical skills and ability?

Has the use of TEL strategies helped to improve your mathematical skills and ability?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	18.0	18.0	18.0
	Yes	27	54.0	54.0	72.0

Not sure	14	28.0	28.0	100.0
Total	50	100.0	100.0	

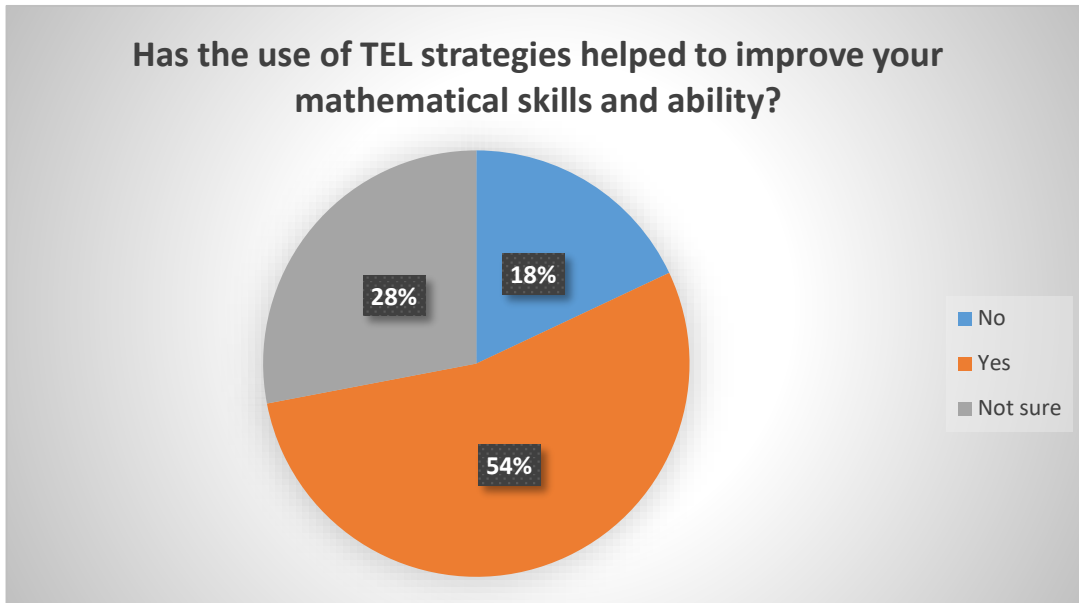


Table 29: Has the use of TEL strategies helped to improve your mathematical skills and ability?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (54%) think that the use of TEL helped to improve the mathematical skills and abilities and very few learners (18%) do not think that the use of TEL helped to improve the mathematical skills and abilities.

Q27: Has the use of TEL helped you to make progress and improvements in your learning?

Has the use of TEL helped you to make progress and improvements in your learning?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	No	12	24.0	24.0	24.0
	Yes	23	46.0	46.0	70.0
	Not sure	15	30.0	30.0	100.0
	Total	50	100.0	100.0	

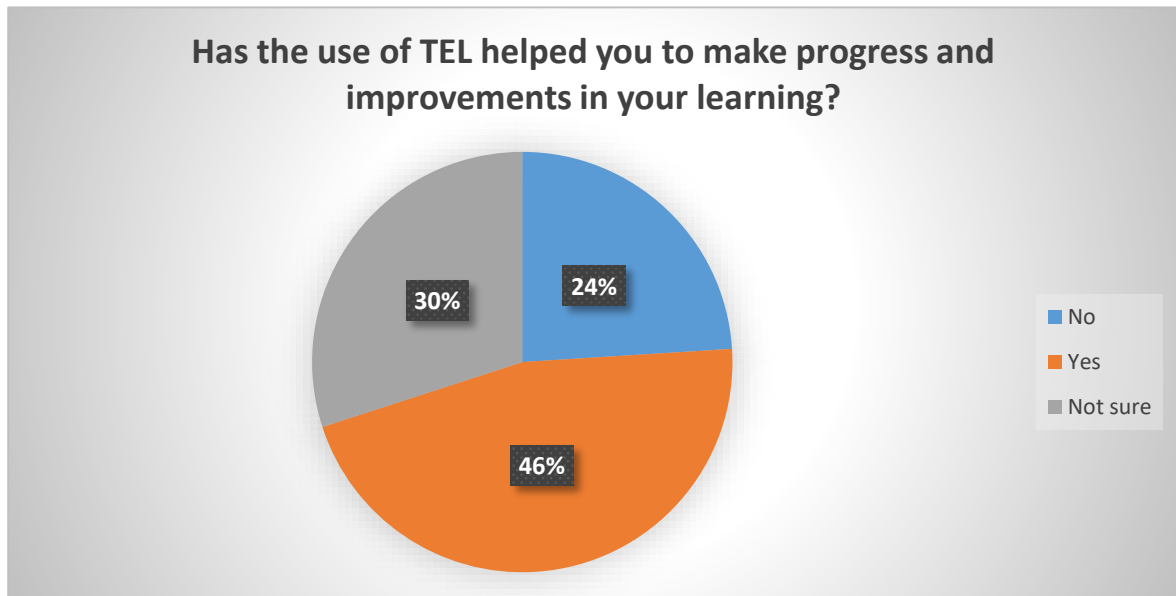


Table 30: Has the use of TEL helped you to make progress and improvements in your learning?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (46%) learners think that the use of TEL helped to make progress and improvements in their learning and very few learners (24%) do not think that the use of TEL helped to make progress and improvements in their learning.

Q28: Has the use of TEL helped you to gain good exam results?

Has the use of TEL helped you to gain good exam results?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	14	28.0	28.0	28.0
	Yes	25	50.0	50.0	78.0
	Not sure	11	22.0	22.0	100.0
	Total	50	100.0	100.0	

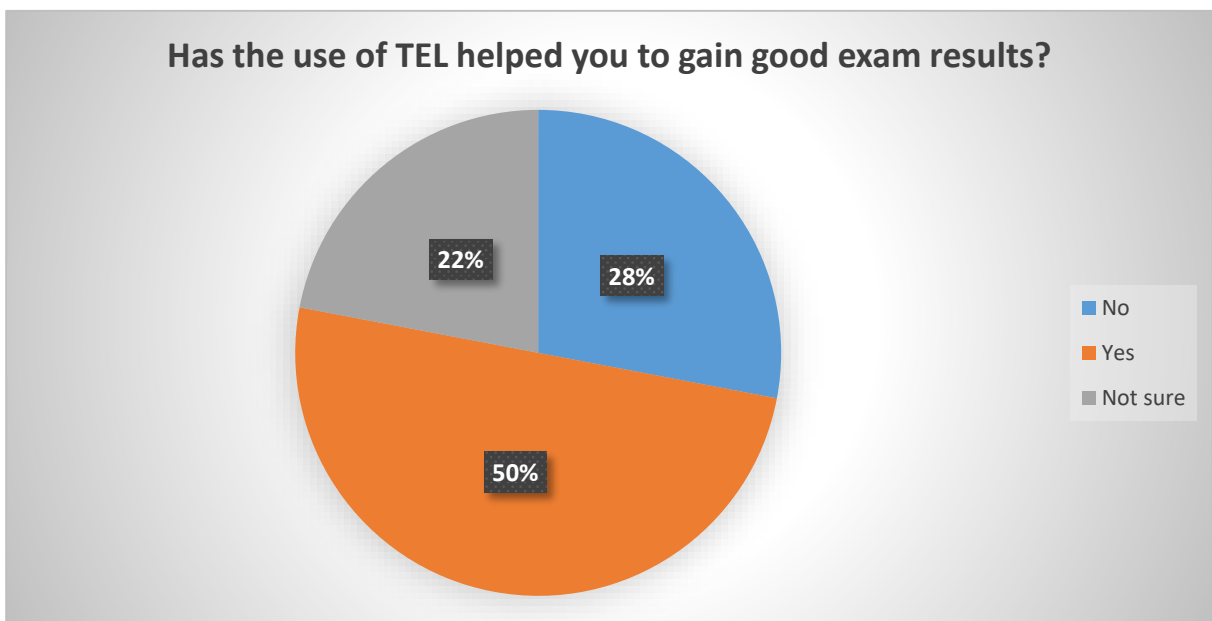


Table 31: Has the use of TEL helped you to gain good exam results?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (50%) think that the use of TEL helped in gaining good exam results and very few learners (22%) are not sure that the use of TEL helped in gaining good exam results.

Q29: Has the use of TEL helped you to get good grades in English?

Has the use of TEL helped you to get good grades in English?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	5	10.0	10.0	10.0
	Yes	36	72.0	72.0	82.0
	Not sure	9	18.0	18.0	100.0
	Total	50	100.0	100.0	

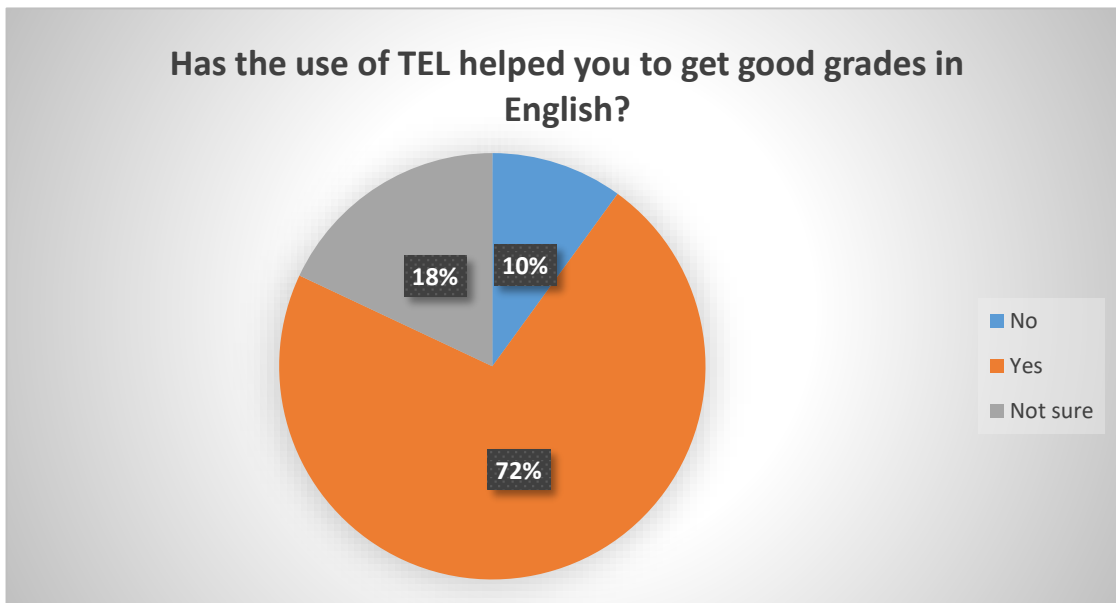


Table 32: Has the use of TEL helped you to get good grades in English?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (72%) think that the use of TEL helped in getting good grades in English and very few learners (10%) do not think that the use of TEL helped in getting good grades in English.

Q30: Has the use of TEL made you want to study more?

Has the use of TEL made you want to study more?

Answer		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	32.0	32.0	32.0
	No	13	26.0	26.0	58.0
	Not sure	21	42.0	42.0	100.0
	Total	50	100.0	100.0	

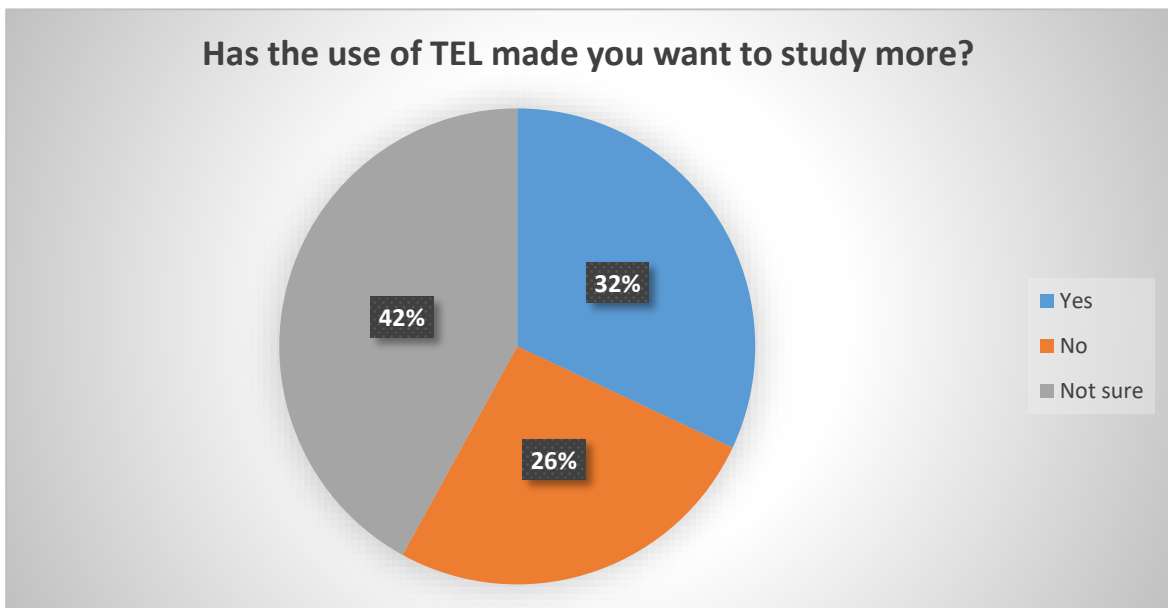


Table 33: Has the use of TEL made you want to study more?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (42%) are not sure that the use of TEL made them study more and very few learners (26%) do not think that the use of TEL made them study more.

Q31: Does the use of TEL make you more interested in learning?

Does the use of TEL make you more interested in learning?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	14	28.0	28.0	28.0
Yes	24	48.0	48.0	76.0
Not sure	12	24.0	24.0	100.0
Total	50	100.0	100.0	

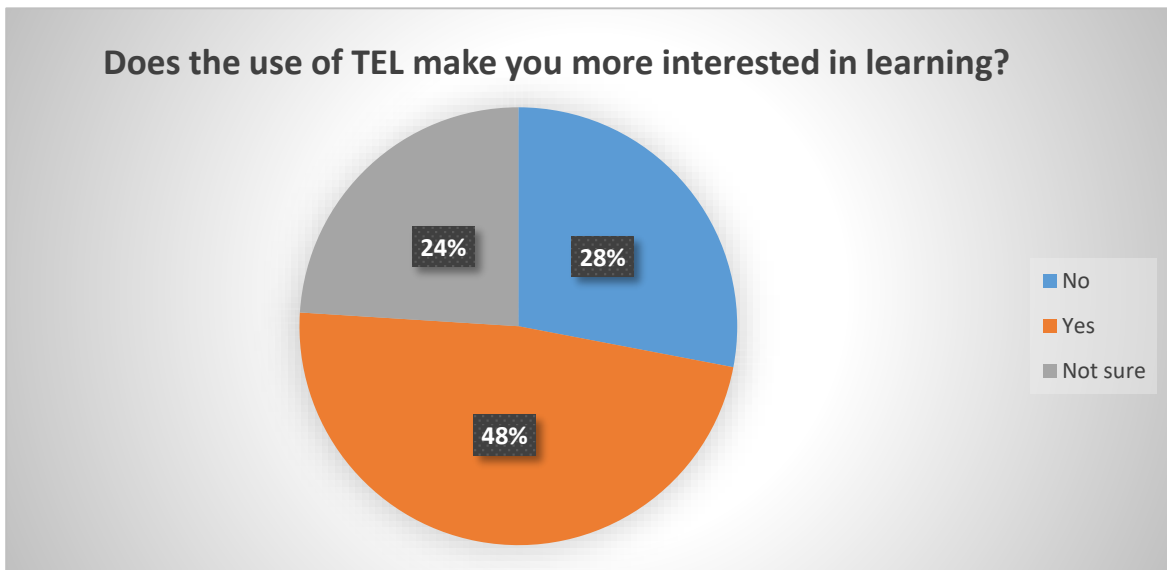


Table 34: Does the use of TEL make you more interested in learning?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (48%) think that the use of TEL generates more interest in learning and very few learners (24%) are not sure that the use of TEL generates more interest in learning.

Q32: How long can you learn using web based or online resources?

How long can you learn using web based or online resources?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
30 min - 1 hour	4	8.0	8.0	8.0
1.5 hours - 2 hours	15	30.0	30.0	38.0
2.5 hours - 4 hours	19	38.0	38.0	76.0
More than 4 hours	12	24.0	24.0	100.0
Total	50	100.0	100.0	

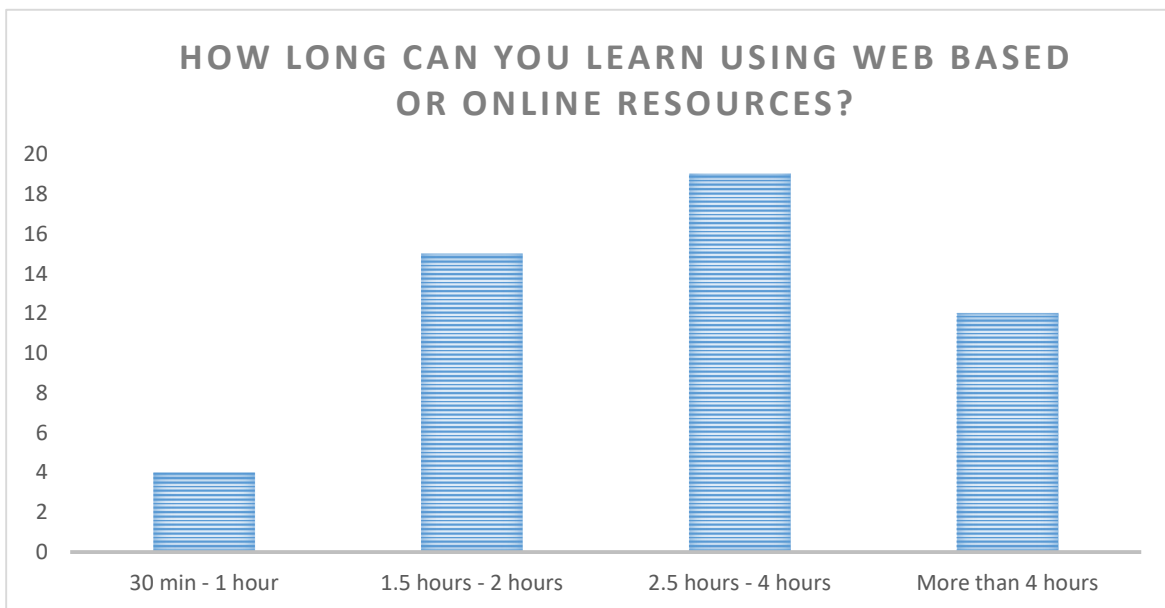


Table 35: How long can you learn using web based or online resources?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (30%) think that they can learn for 1.5 hours - 2 hours using web based and online resources and very few learners (8%) think that they can learn for 30 min - 1 hour using web

based and online resources.

Q33: Are you able to apply TEL skills you have developed in other subject areas?

Are you able to apply TEL skills you have developed in other subject areas?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	23	46.0	46.0	46.0
Yes	27	54.0	54.0	100.0
Total	50	100.0	100.0	

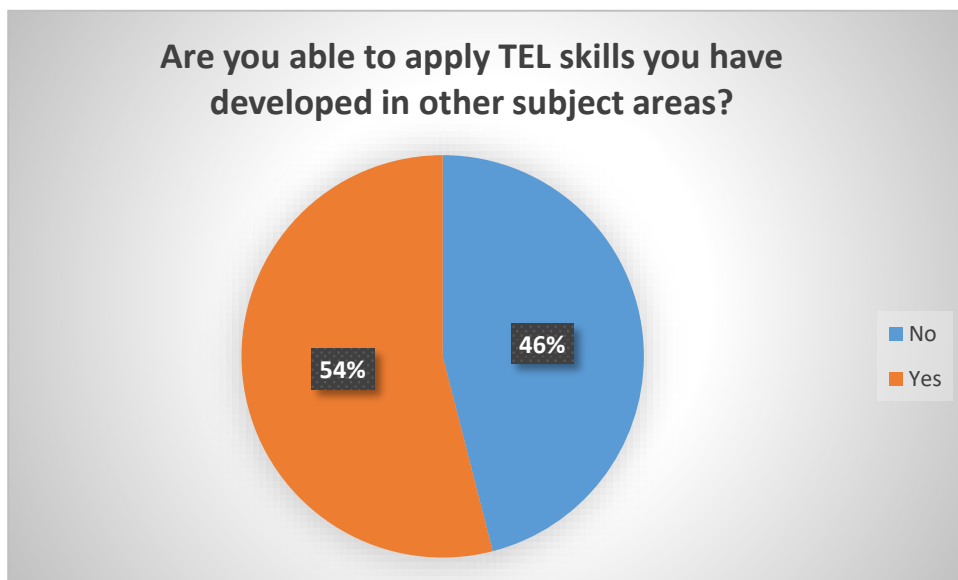


Table 36: Are you able to apply TEL skills you have developed in other subject areas?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum learners (54%)

learners think that they are able to apply TEL skills in other subject areas and very few learners (46%) do not think that they are able to apply TEL skills in other subject areas.

Hence the above frequency tables and graphical representations, we conclude that learners are highly benefited by the Technology Enhanced Learning practices.

Appendix K2: Data Analysis -Teachers

Q1: Subject Taught

Subjects Taught

Subjects	Frequency	Percent	Valid Percent	Cumulative Percent
Mathematics	1	11.1	11.1	11.1
English	4	44.4	44.4	55.6
MFL	4	44.4	44.4	100.0
Total	9	100.0	100.0	

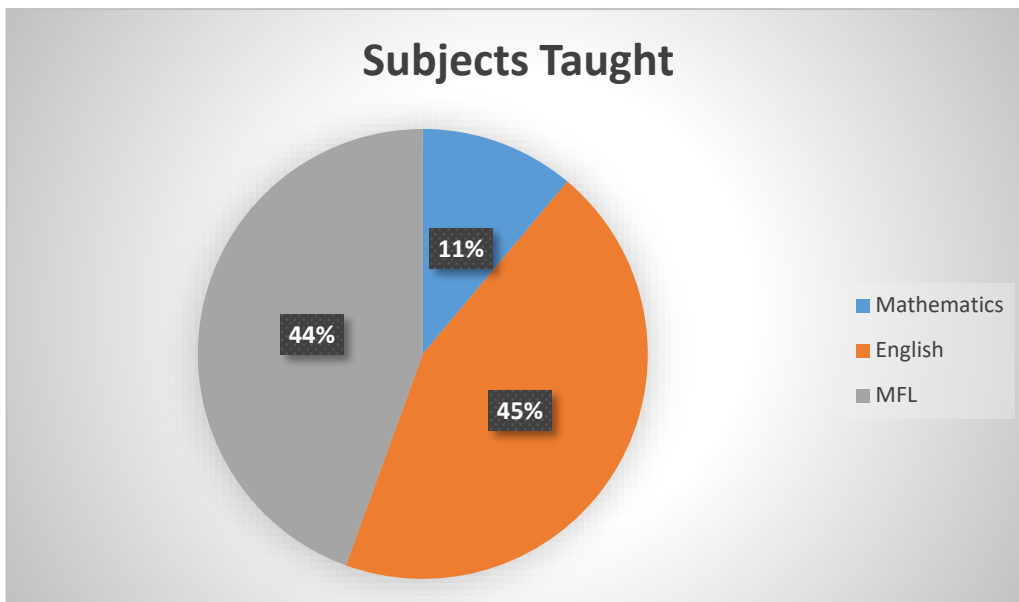


Table 37: Subjects taught

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (44.4%) teach English and Modern Foreign Languages and very few teachers (11.1%) teach Mathematics.

Q2: Do you use TEL in your lessons?

Do you use TEL in your lessons?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No	3	33.3	33.3	33.3
Yes	6	66.7	66.7	100.0
Total	9	100.0	100.0	

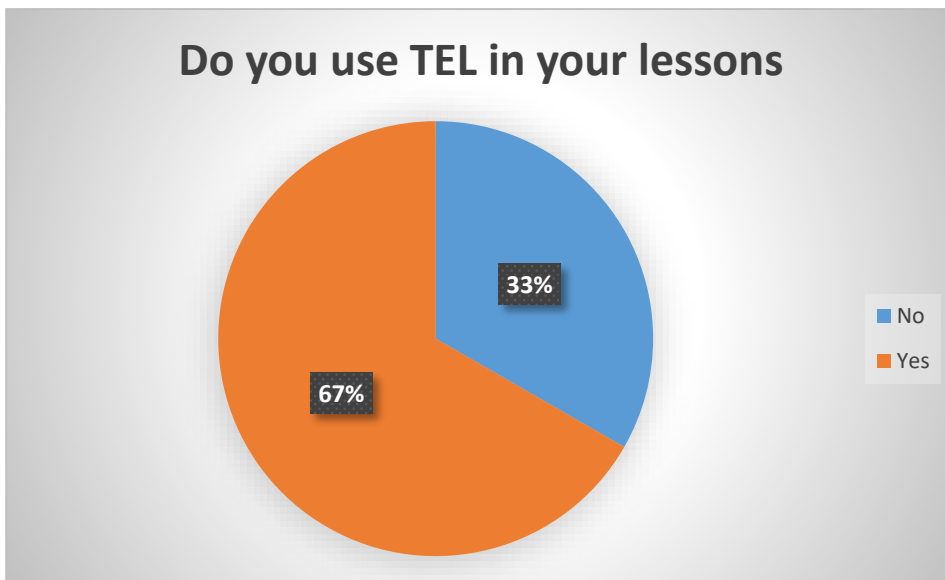


Table 38: Do you use TEL in your lessons?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (66.7%) use TEL in their lessons and very few teachers (33.3%) do not use TEL in their lessons.

The research question basically aims to examine different strategies of Technology Enhanced Learning Practices used by teachers to teach their respective subjects.

Q3: What types of TEL do you use in your lessons?

What types of TEL do you use in your lessons?

Types of TEL	Frequency	Percent	Valid Percent	Cumulative Percent
Interactive whiteboards	1	11.1	11.1	11.1
Overhead projectors	1	11.1	11.1	22.2
Computers	3	33.3	33.3	55.6
Internet	1	11.1	11.1	66.7

Web based teaching and learning resources	1	11.1	11.1	77.8
Camcorders/Digital Cameras	1	11.1	11.1	88.9
Scanners	1	11.1	11.1	100.0
Total	9	100.0	100.0	

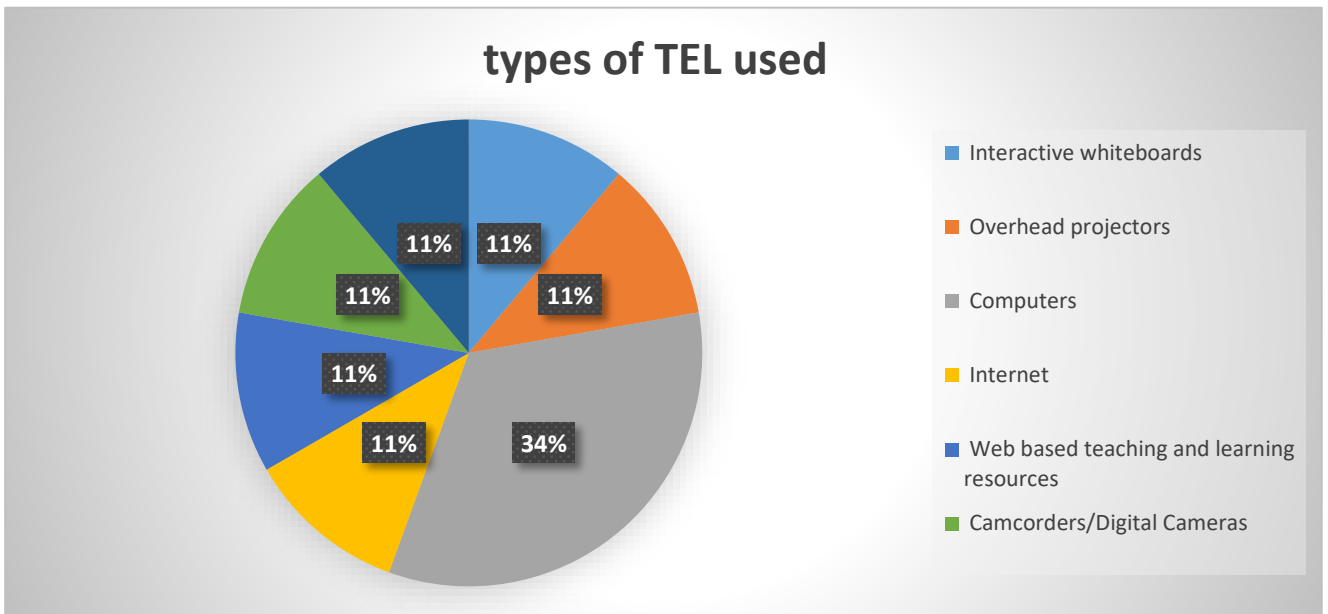


Table 39: What types of TEL do you use in your lessons?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (33.3%) use computers as one of the TEL practices and very few teachers (11.1%) use interactive white boards, internet, web based teaching and learning resources, cam-recorders / digital cameras, scanners and printers as types of TEL practices.

Q4: How do you use TEL in your lessons?

How do you use TEL in your lessons?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
For explaining work/ tasks	1	11.1	11.1	11.1
For explaining concepts	2	22.2	22.2	33.3
For class-work	2	22.2	22.2	55.6
For extension activities for what has been taught/practice	2	22.2	22.2	77.8
For homework	2	22.2	22.2	100.0
Total	9	100.0	100.0	

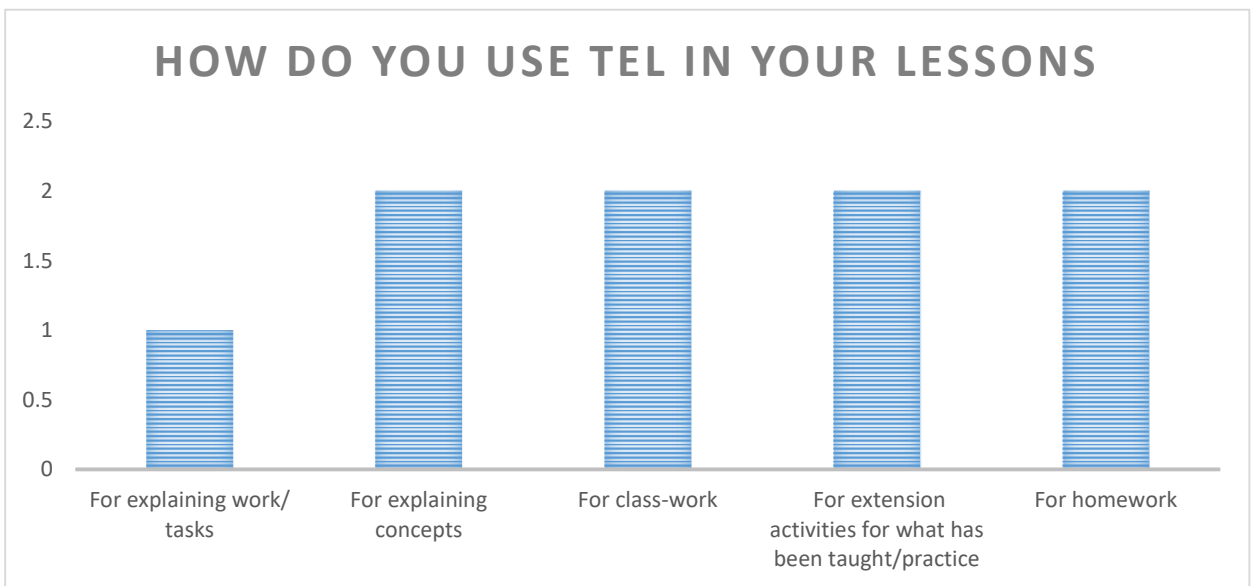


Table 40: How do you use TEL in your lessons?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum teachers (22.2%) use TEL in explaining concepts, assigning class-works, an extra learning practice for what has been taught, assigning homework and other tasks and very few teachers (11.1%) use TEL in explaining work/ tasks.

Hence from the above frequency tables and graphical representations, we conclude

that teachers use different strategies and exercise different types of TEL practices to make it more interactive and impactful for learners.

Q5: Has the use of TEL in teaching helped improve your learners' grades in the subject?

Has the use of TEL in teaching helped improve your learners' grades in the subject?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	4	44.4	44.4	44.4
No	3	33.3	33.3	77.8
Not sure	2	22.2	22.2	100.0
Total	9	100.0	100.0	

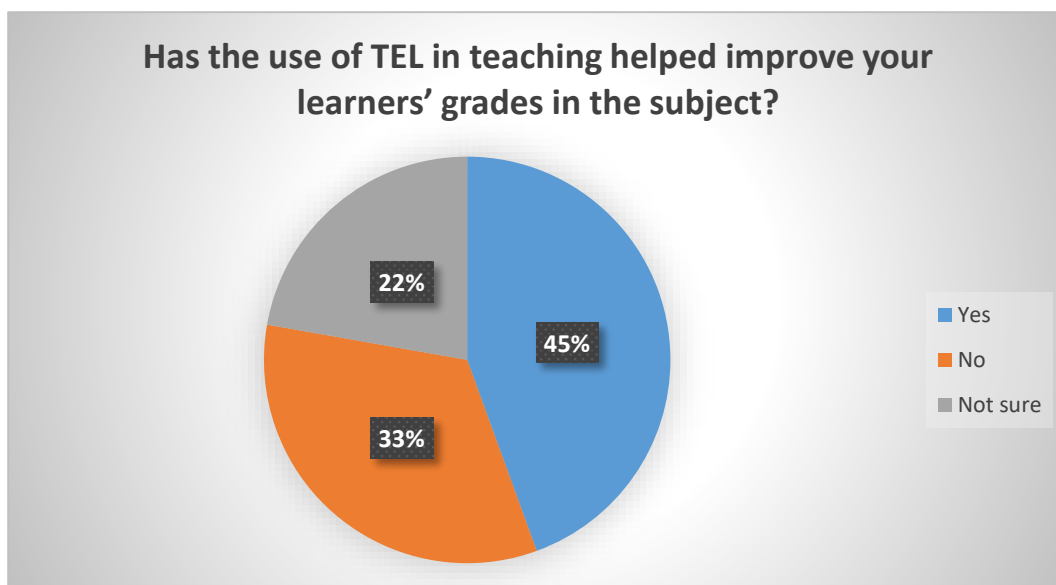


Table 41: Has the use of TEL in teaching helped improve your learners' grades in the

subject?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (44.4%) think that use of TEL in teaching helped improve their learners' grades in the subject and very few teachers (22.2%) are not sure that use of TEL in teaching helped improve your learners' grades in the subject.

TEL PRACTICES IN THE CLASSROOM BENEFITS THE EAL LEARNERS

Research Question: How does the use of TEL practices benefit the EAL learners in attainment and improved exam results for Mathematics, English and Modern Foreign Languages?

The research question basically aims to examine how TEL practices benefits the EAL learners.

Q6: How has it helped?

How has it helped?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Made teaching the subject easier	2	22.2	22.2	22.2
Made the subject more practical	2	22.2	22.2	44.4
Made EAL learners independent learners	1	11.1	11.1	55.6
Helped EAL learners complete more homework tasks	1	11.1	11.1	66.7
Helped EAL learners to improve their grades	1	11.1	11.1	77.8

Improved EAL learners attention span	1	11.1	11.1	88.9
Made learners engage more in lessons	1	11.1	11.1	100.0
Total	9	100.0	100.0	

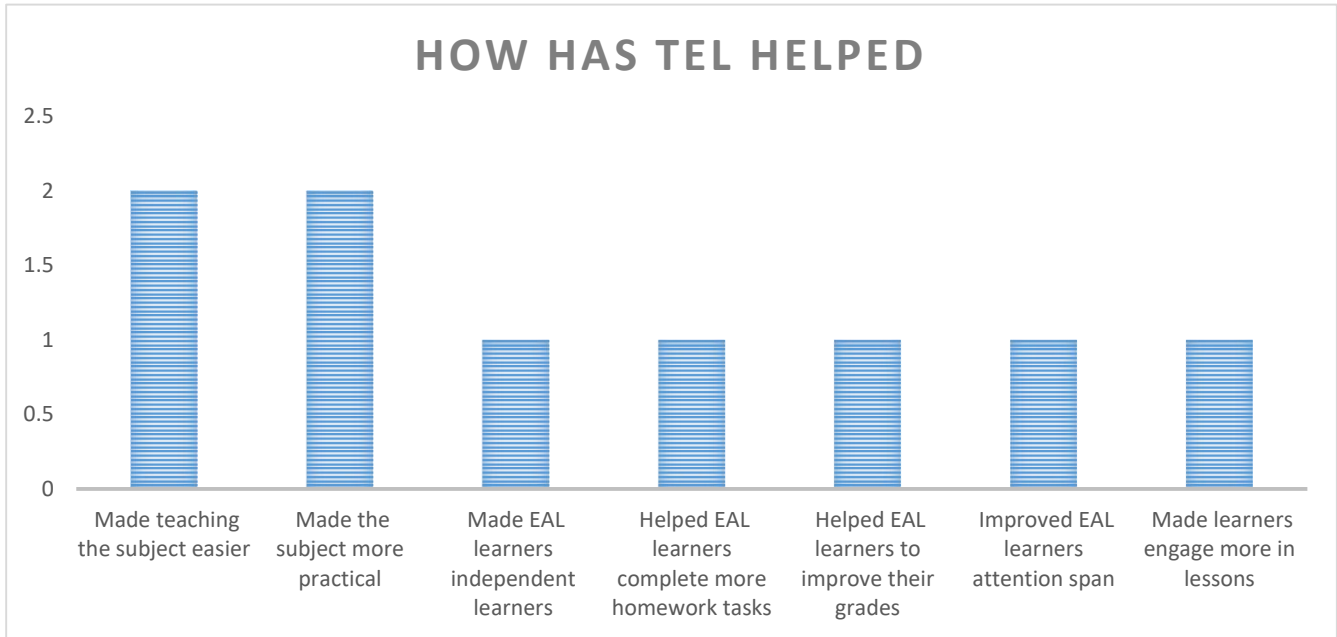


Table 42: How has it helped?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum teachers (22.2%) observed that TEL has made teaching of the subject easier and more practical hence, made the EAL learners more independent, they tend to complete more homework tasks and helped in improving their grades. Also, TEL practices helped the EAL learners in increasing their attention span for the subjects and have increased their engagements in the lessons.

Q7: Has the use of TEL helped EAL learners gain good exam results in your subject?

Has the use of TEL helped EAL learners gain good exam results in your subject?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	4	44.4	44.4	44.4
No	2	22.2	22.2	66.7
Not sure	3	33.3	33.3	100.0
Total	9	100.0	100.0	

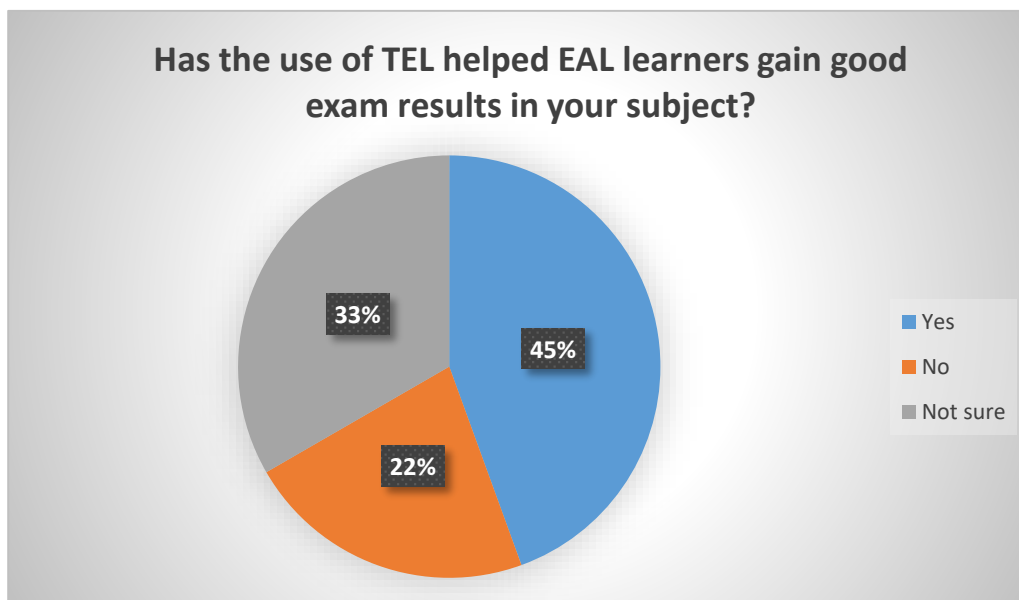


Table 43: Has the use of TEL helped EAL learners gain good exam results in your subject?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (44.4%) observed that use of TEL helped EAL learners gain good exam results in their subjects and very few teachers (22.2%) observed that use of TEL didn't help EAL learners gain good exam results in their subjects.

Hence from the above frequency table and the graphical representation, we conclude that the use of TEL practices benefited the EAL learners in attainment and improved

exam results for Mathematics, English and Modern Foreign Languages.

Q8: Has the use of TEL strategies helped improve your instructional skills?

Has the use of TEL strategies helped improve your instructional skills?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	5	55.6	55.6	55.6
No	2	22.2	22.2	77.8
Not sure	2	22.2	22.2	100.0
Total	9	100.0	100.0	

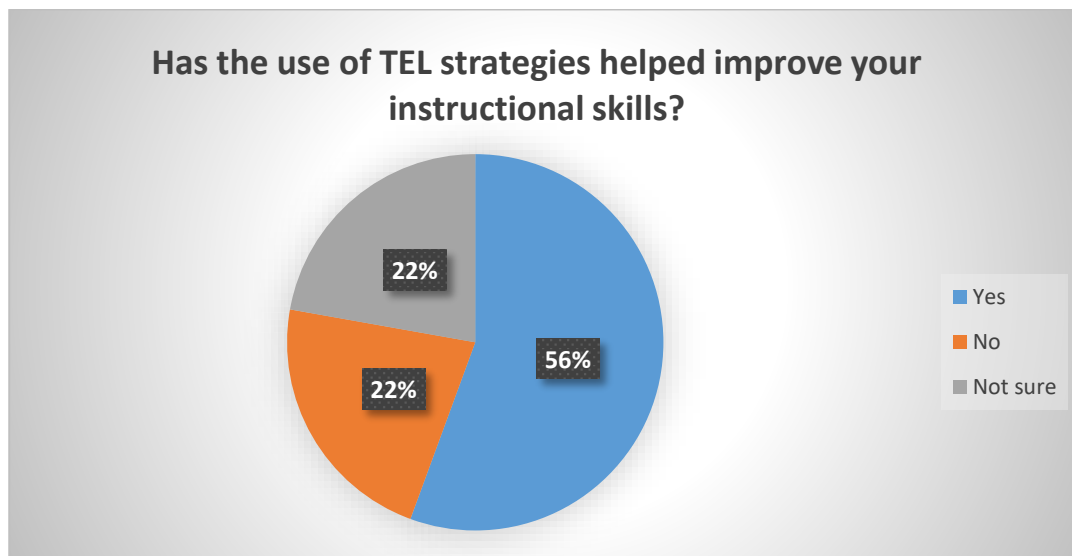


Table 44: Has the use of TEL strategies helped improve your instructional skills?

INTERPRETATION:

From the above frequency table and pie chart, we infer that a maximum number of teachers (55.6%) feel that use of TEL strategies helped them in improving their

instructional skills and very few teachers (22.2%) do not feel that use of TEL strategies help improving the instructional skills.

Q9: Do you have challenges using TEL to teach your lessons?

Do you have challenges using TEL to teach your lessons?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	2	22.2	22.2	22.2
No	5	55.6	55.6	77.8
Not sure	2	22.2	22.2	100.0
Total	9	100.0	100.0	

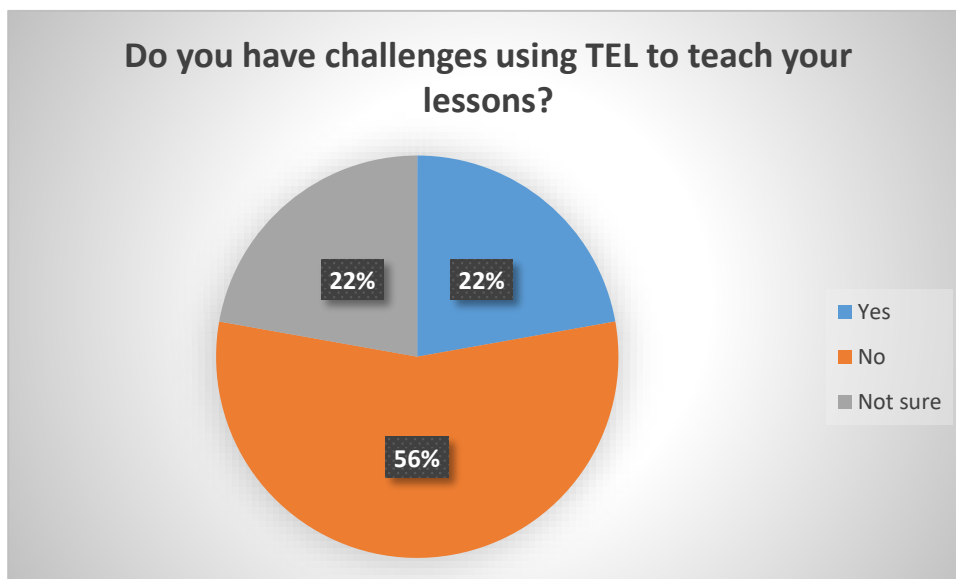


Table 45: Do you have challenges using TEL to teach your lessons?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers (55.6%) do not face challenges using TEL to teach their lessons and very few teachers

(22.2%) faced challenges using TEL to teach their lessons.

Q10: Does lesson preparation incorporating TEL take more time than lessons without TEL?

Does lesson preparation incorporating TEL take more time than lessons without TEL?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	4	44.4	44.4	44.4
No	3	33.3	33.3	77.8
Not sure	2	22.2	22.2	100.0
Total	9	100.0	100.0	

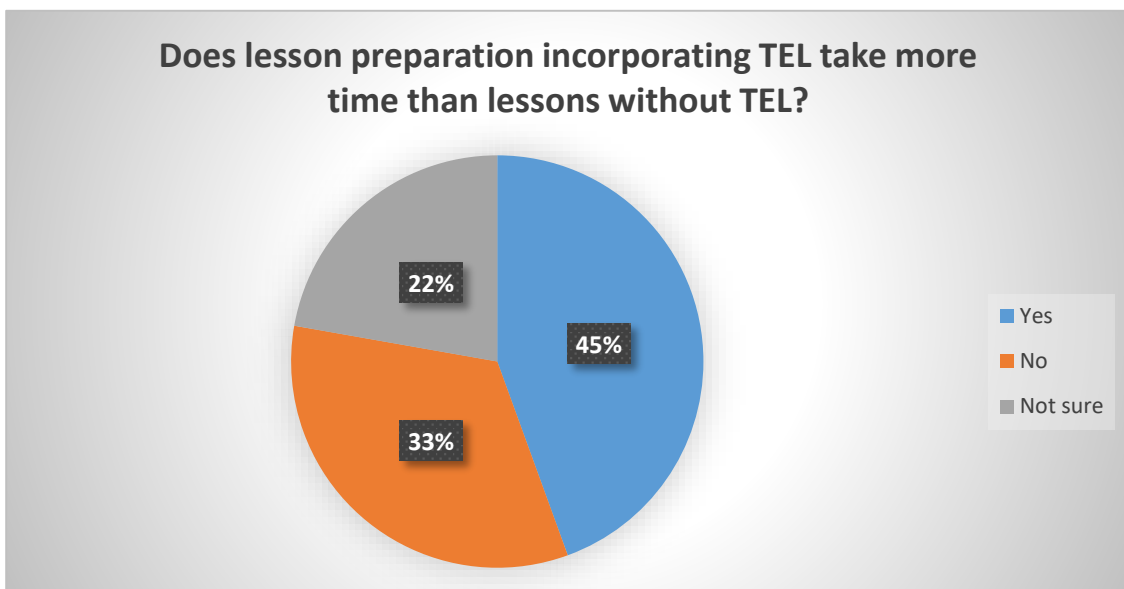


Table 46: Does lesson preparation incorporating TEL take more time than lessons without TEL?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers

(44.4%) teachers feel that lesson preparation incorporating TEL take more time than lessons without TEL and very few teachers (22.2%) are not sure that they feel that lesson preparation incorporating TEL take more time than lessons without TEL.

Q11: Would you readily use TEL in teaching EAL learners?

Would you readily use TEL in teaching EAL learners?

Answer	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	4	44.4	44.4	44.4
No	2	22.2	22.2	66.7
Not sure	3	33.3	33.3	100.0
Total	9	100.0	100.0	

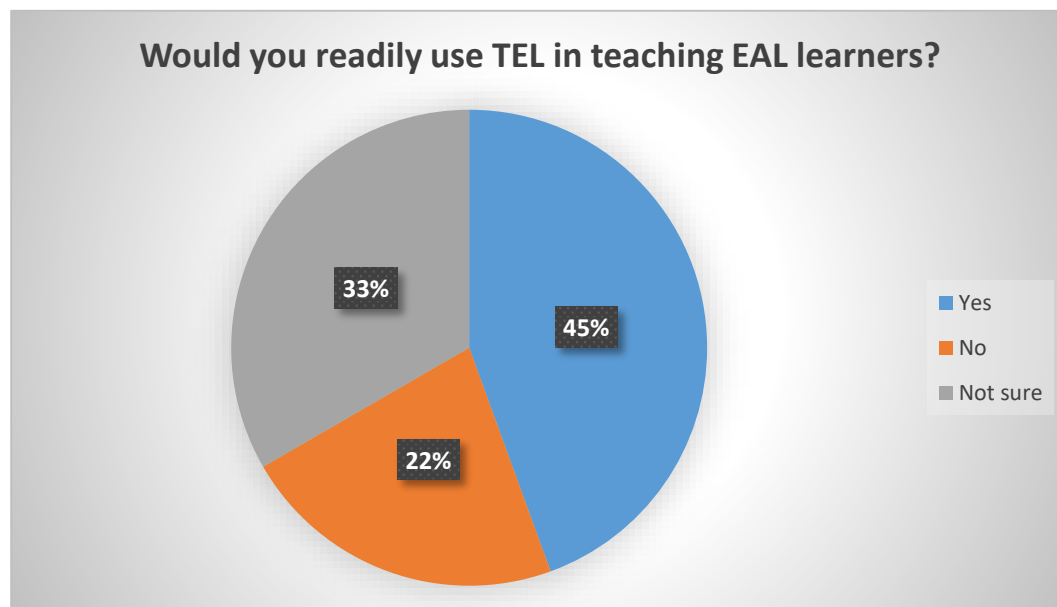


Table 47: Would you readily use TEL in teaching EAL learners?

INTERPRETATION:

From the above frequency table and pie chart, we infer that maximum teachers

(44.4%) will readily use TEL in teaching EAL learners and very few teachers (22.2%) will not use TEL in teaching EAL learners readily.

Appendix K3: Data Analysis – Observation Schedule

Q: How is knowledge constructed and shared in the classroom

How is knowledge constructed and shared in the classroom

	Frequency	Percent	Valid Percent	Cumulative Percent
Disputatious	22	44.0	44.0	44.0
Cumulative	14	28.0	28.0	72.0
Exploratory	14	28.0	28.0	100.0
Total	50	100.0	100.0	

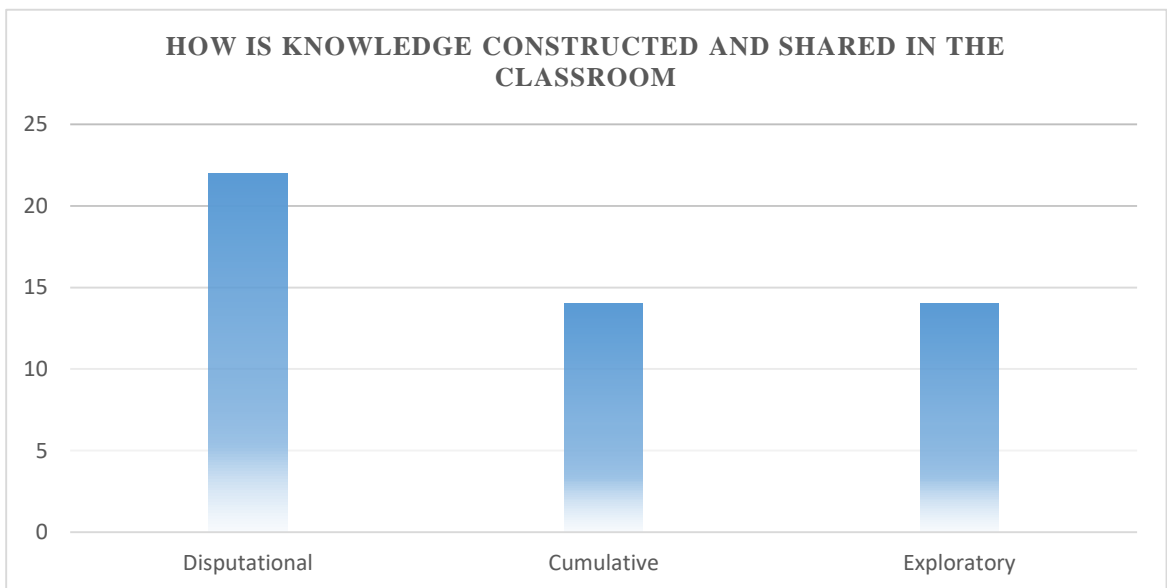


Table 48: How is knowledge constructed and shared in the classroom

INTERPRETATION:

From the above frequency table and bar graph, we infer that 44% disputatious knowledge, 28% cumulative knowledge and 28% exploratory knowledge is constructed and shared in the classroom.

Q: What kind of speech acts do learners perform?

What kind of speech acts do learners perform

	Frequency	Percent	Valid Percent	Cumulative Percent
Assert	20	40.0	40.0	40.0
Challenge	9	18.0	18.0	58.0
Explain	10	20.0	20.0	78.0
Respond to teacher's question	11	22.0	22.0	100.0
Total	50	100.0	100.0	

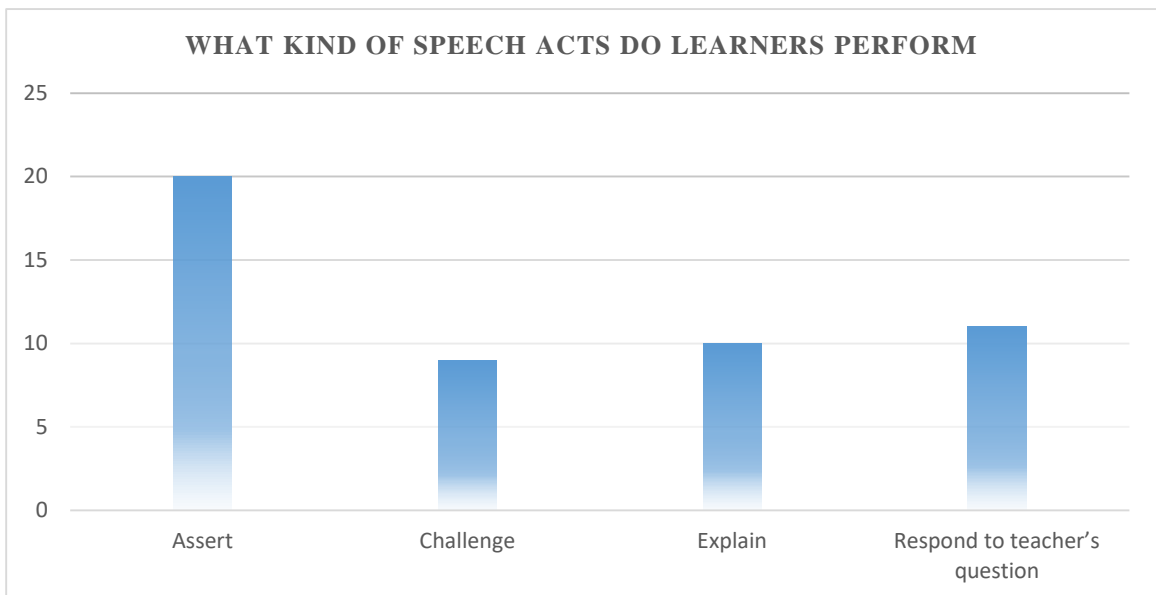


Table 49: What kind of speech acts do learners perform?

INTERPRETATION:

From the above frequency table and bar graph, we infer that maximum learners (44%) perform assert speech acts and very few learners (18%) perform challenging speech acts.

Appendix K4: Reliability Testing and Factor Analysis

Reliability analysis refers to the fact that a scale should consistently reflect the construct it is measuring. There are certain times and situations where it can be useful. An aspect in which the researcher can use reliability analysis is when two observations under study that are equivalent to each other in terms of the construct being measured also have the equivalent outcome.

Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called **factors**. **Factor analysis** aims to find independent latent variables.

Much like cluster analysis involves grouping similar cases, factor analysis involves

grouping similar variables into dimensions.

Here, the cronbach's alpha reliability test and factor analysis are applied in order to analyse all the factors for teaching and learning involved in observation schedules and then group those that have an equivalent effect.

Q: Observation Schedule Factors

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.843	.832	10

INTERPRETATION:

Cronbach Alpha is a reliability test conducted within SPSS in order to measure the internal consistency i.e. reliability of the measuring instrument (Questionnaire). It is most commonly used when the questionnaire is developed using multiple likert scale statements and therefore to determine if the scale is reliable or not.

Here, Cronbach's alpha = 0.843 > 0.5

It reflects high reliability of the measuring instrument. Furthermore, it indicates high level of internal consistency with respect to the specific sample.

Appendix K5: Inter-Item Correlation Matrix

	Setting the scene	Physical equipment	Strategies	Class interaction	knowledge	Speech act	Remedial activities	Enrichment activities	Teaching approach	Learners engagement
Setting the scene	1.000	-.132	-.123	-.243	.022	.084	-.088	-.055	-.054	-.223
Physical equipment	-.132	1.000	.427	.505	.368	.143	.168	.541	.432	.341
strategies	-.123	.427	1.000	.637	.575	.463	.417	.733	.863	.417
Class interaction	-.243	.505	.637	1.000	.513	.295	.410	.751	.681	.188
knowledge	.022	.368	.575	.513	1.000	.338	.414	.720	.608	.247
Speech act	.084	.143	.463	.295	.338	1.000	.278	.193	.411	.127

Remedial activities	-.088	.168	.417	.410	.414	.278	1.000	.439	.466	.089
Enrichment activities	-.055	.541	.733	.751	.720	.193	.439	1.000	.765	.361
Teaching approach	-.054	.432	.863	.681	.608	.411	.466	.765	1.000	.381
Learners engagement	-.223	.341	.417	.188	.247	.127	.089	.361	.381	1.000

INTERPRETATION:

The inter item correlation matrix shows the correlation between the factors.

Correlations estimate the strength of the linear relationship between two (and only two) variables. Correlation coefficients range from [-1.0] (a perfect negative correlation) to positive [1.0] (a perfect positive correlation). The closer correlation coefficient gets to [-1.0] or [1.0], the stronger the correlation. The closer a correlation coefficient gets to zero, the weaker the correlation is between the two variables. We denote the correlation coefficient by 'r'.

The value of r differs as follows –

- **Exactly -1.** A perfect downhill (negative) linear relationship
- **-0.70.** A strong downhill (negative) linear relationship
- **-0.50.** A moderate downhill (negative) relationship
- **-0.30.** A weak downhill (negative) linear relationship
- **0.** No linear relationship
- **+0.30.** A weak uphill (positive) linear relationship
- **+0.50.** A moderate uphill (positive) relationship
- **+0.70.** A strong uphill (positive) linear relationship
- **Exactly +1.** A perfect uphill (positive) linear relationship

Appendix K6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.795
Bartlett's Test of Sphericity	Approx. Chi-Square	253.108
	df	45
	Sig.	.000

INTERPRETATION:

KMO measures the sampling adequacy (which determines if the responses given with the sample are adequate or not) which is $0.795 > 0.6$ i.e. reasonably highly acceptable for factor analysis to proceed.

Bartlett's test is another indication of the strength of the relationship among variables. Communalities

	Initial	Extraction
Setting the scene	1.000	.582
Physical equipment	1.000	.476
Strategies	1.000	.779
Class interaction	1.000	.664
Knowledge	1.000	.617
Speech act	1.000	.440
Remedial activities	1.000	.381
Enrichment activities	1.000	.792
Teaching approach	1.000	.812
Learners engagement	1.000	.445

Bartlett's test of Sphericity is significant (0.000) when correlation matrix is not an

Extraction Method: Principal Component Analysis.

identity matrix.

INTERPRETATION:

The table of communalities show how much variance (i.e. the communality value which should be more than 0.5 to be considered for further analysis) in the variables has been accounted by the extracted factors.

Appendix K7: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.738	47.381	47.381	4.738	47.381	47.381	4.198	41.975	41.975
2	1.250	12.505	59.886	1.250	12.505	59.886	1.791	17.910	59.886
3	.916	9.164	69.050						
4	.876	8.755	77.805						
5	.675	6.752	84.557						
6	.546	5.459	90.016						
7	.464	4.644	94.660						
8	.286	2.859	97.519						
9	.138	1.382	98.901						
10	.110	1.099	100.000						

Extraction Method: Principal Component Analysis.

INTERPRETATION:

The table of total variance explained describes the total variance of components (59.886%) and extract the components whose initial total eigenvalues is more than 1. Here from the table above, only 2 component is extracted out of 10.

Scree Plot:

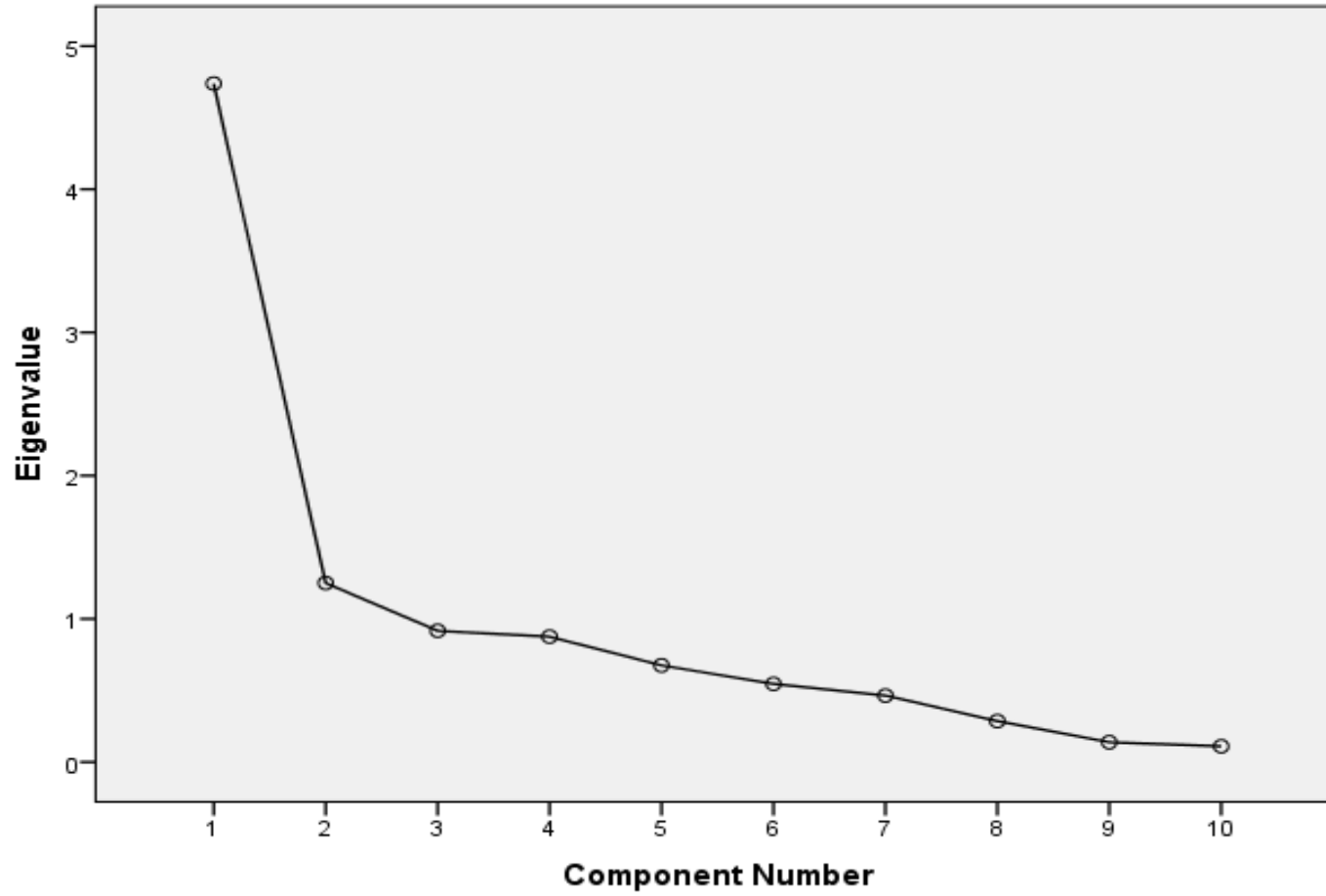
(Graph of eigenvalues against factors)

Eigenvalues reflect the no. of extracted factors.

Here those factors whose eigenvalues > 1 are considered.

The, graph determines that how many factors are required to be retained.

Scree Plot



Appendix K8: Rotated Component Matrix

	Component	
	1	2
Teaching approach	.860	
Strategies	.827	.309
Enrichment activities	.805	.380
Knowledge	.778	
Class interaction	.709	.402
Remedial activities	.617	
Speech act	.613	
Setting the scene		-.748
Learners engagement		.625
Physical equipment	.429	.540

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

INTERPRETATION:

Rotated Component Matrix: It consider the values >0.5 .

Here teaching approach, strategies, enrichment activities, knowledge, class interaction, remedial activities and speech acts are substantially loaded on component 1.

Learner's engagement and physical equipment are substantially loaded on component 2.

Appendix L: Evaluative Test Results

Appendix L1a: Modern Foreign Languages

	Evaluative Test 1		Evaluative Test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	30	52	50	57
Learner 2	45	51	60	51
Learner 3	15	67	43	60
Learner 4	23	50	34	51
Learner 5	45	69	55	70
Learner 6	56	63	60	61
Learner 7	41	55	47	59
Learner 8	34	48	40	50
Learner 9	59	71	70	72
Learner 10	46	51	55	50
Learner 11	45	56	78	60
Learner 12	60	69	62	70
Learner 13	43	55	56	59
Learner 14	38	72	40	79
Learner 15	13	60	45	67

Learner 16	45	57	50	50
Learner 17	49	55	52	60
Learner 18	60	73	61	80
Learner 19	23	50	43	52
Learner 20	35	49	46	50
Learner 21	29	70	45	73
Learner 22	35	56	50	57
Learner 23	65	66	66	60
Learner 24	22	34	40	40
Learner 25	40	51	45	55
Learner 26	37	56	48	56
Learner 27	55	60	59	60
Learner 28	49	49	52	51
Learner 29	50	56	60	57
Learner 30	51	60	54	58
Learner 31	12	50	24	54
Learner 32	38	57	46	60
Learner 33	34	56	44	55
Learner 34	51	78	58	76
Learner 35	20	51	39	55
Learner 36	15	56	23	60
Learner 37	33	65	45	69

INTERPRETATION:

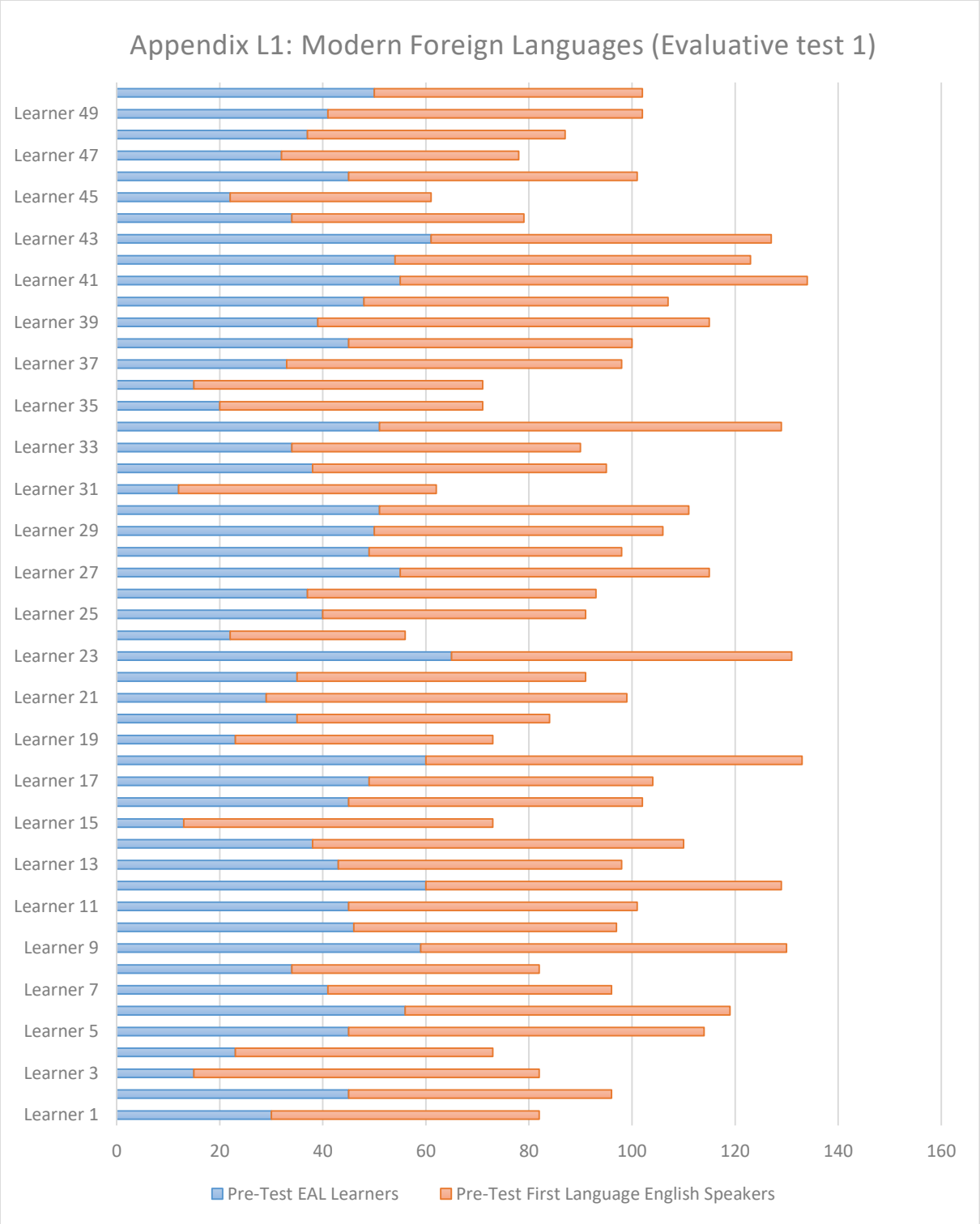
Learner 38	45	55	57	60
Learner 39	39	76	42	80
Learner 40	48	59	55	61
Learner 41	55	79	55	73
Learner 42	54	69	56	70
Learner 43	61	66	61	57
Learner 44	34	45	45	48
Learner 45	22	39	30	46
Learner 46	45	56	45	50
Learner 47	32	46	45	50
Learner 48	37	50	40	55
Learner 49	41	61	46	67
Learner 50	50	52	60	56

The above tables show the respective comparisons between the test results of EAL learners and First Language English speakers for Modern Foreign Languages before the study (Evaluative test 1) and after the study (Evaluative test 2).

From the above comparisons, we can conclude that maximum number of EAL learners and First Language English speakers have benefited from the consistent use of structured Technology Enhanced Learning practices.

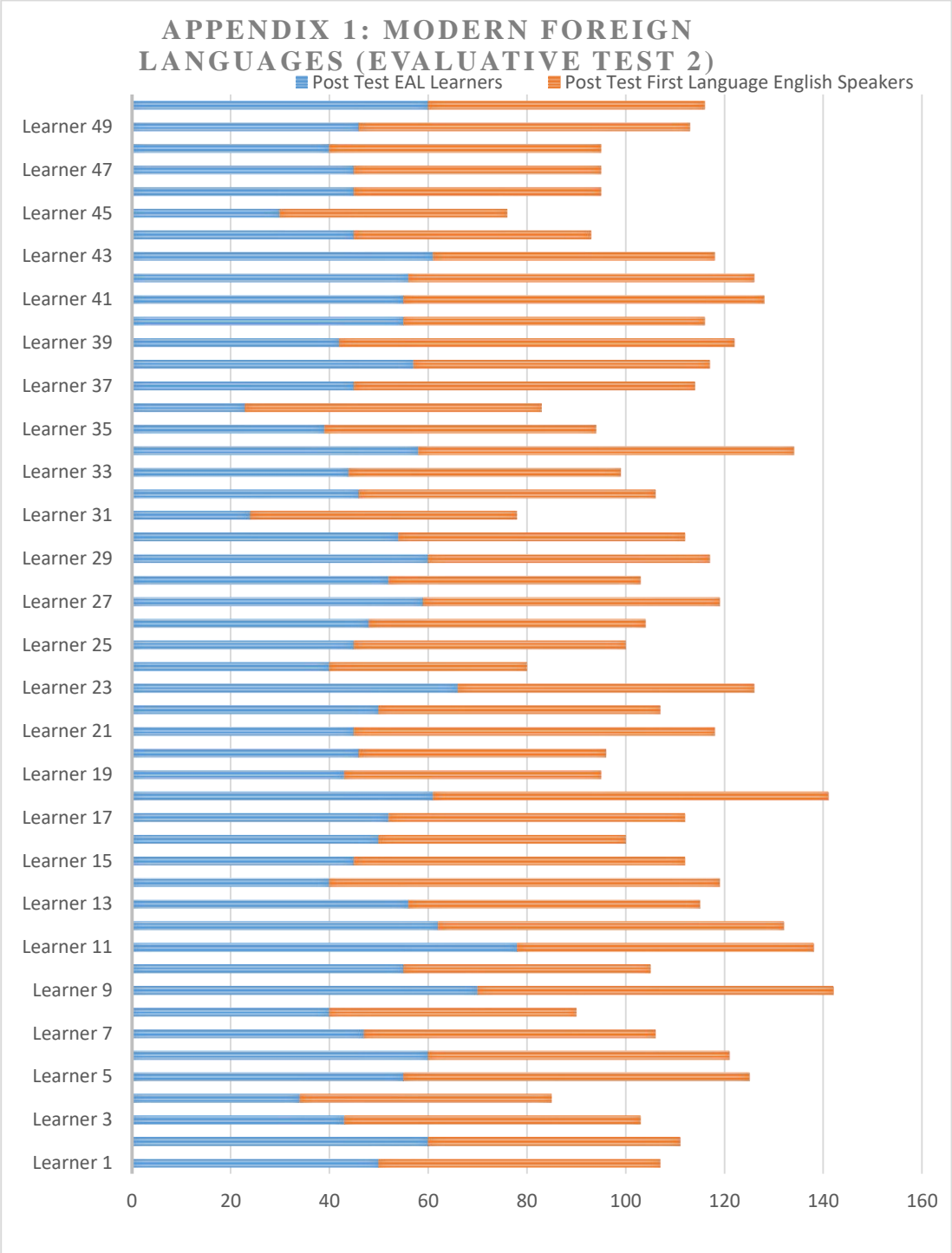
Appendix L1b: Modern Foreign Languages (Evaluation test 1)

Table 45



Appendix L2: Modern Foreign Languages (Evaluative test 2)

Table 46



Appendix L3: Mathematics

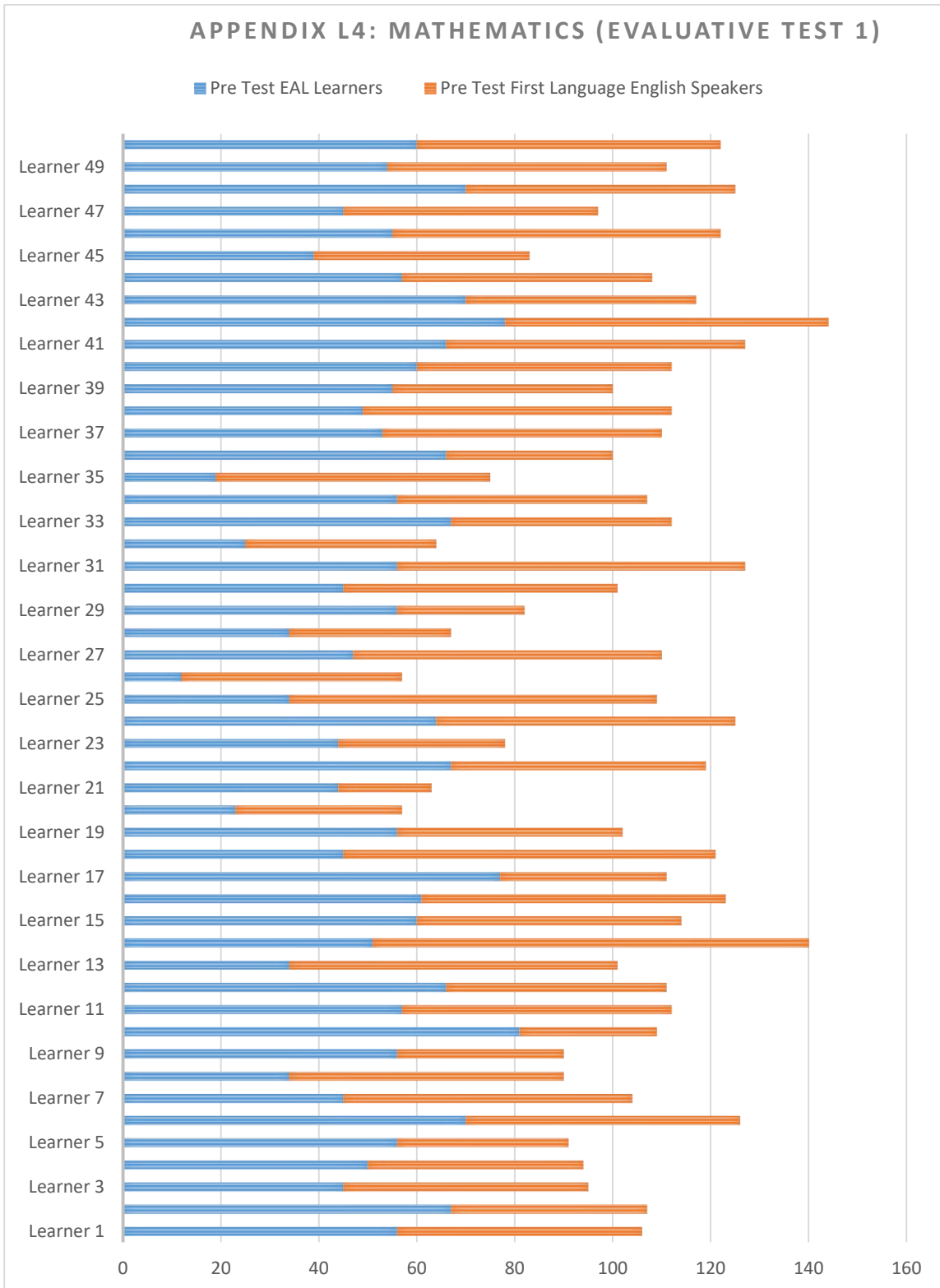
	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	56	50	66	52
Learner 2	67	40	72	48
Learner 3	45	50	50	61
Learner 4	50	44	55	34
Learner 5	56	35	72	50
Learner 6	70	56	77	55
Learner 7	45	59	56	50
Learner 8	34	56	50	61
Learner 9	56	34	63	48
Learner 10	81	28	87	44
Learner 11	57	55	61	34
Learner 12	66	45	74	50
Learner 13	34	67	50	54
Learner 14	51	89	65	78
Learner 15	60	54	71	58
Learner 16	61	62	65	71
Learner 17	77	34	90	40

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 18	45	76	62	70
Learner 19	56	46	58	54
Learner 20	23	34	49	50
Learner 21	44	19	64	34
Learner 22	67	52	82	55
Learner 23	44	34	50	47
Learner 24	64	61	72	60
Learner 25	34	75	47	67
Learner 26	12	45	34	59
Learner 27	47	63	55	55
Learner 28	34	33	50	45
Learner 29	56	26	62	36
Learner 30	45	56	54	58
Learner 31	56	71	60	79
Learner 32	25	39	40	45
Learner 33	67	45	70	55
Learner 34	56	51	70	50
Learner 35	19	56	34	53

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 36	66	34	72	45
Learner 37	53	57	59	60
Learner 38	49	63	60	60
Learner 39	55	45	59	50
Learner 40	60	52	70	50
Learner 41	66	61	70	55
Learner 42	78	66	81	67
Learner 43	70	47	77	48
Learner 44	57	51	60	49
Learner 45	39	44	42	53
Learner 46	55	67	59	65
Learner 47	45	52	56	60
Learner 48	70	55	60	58
Learner 49	54	57	55	56
Learner 50	60	62	71	67

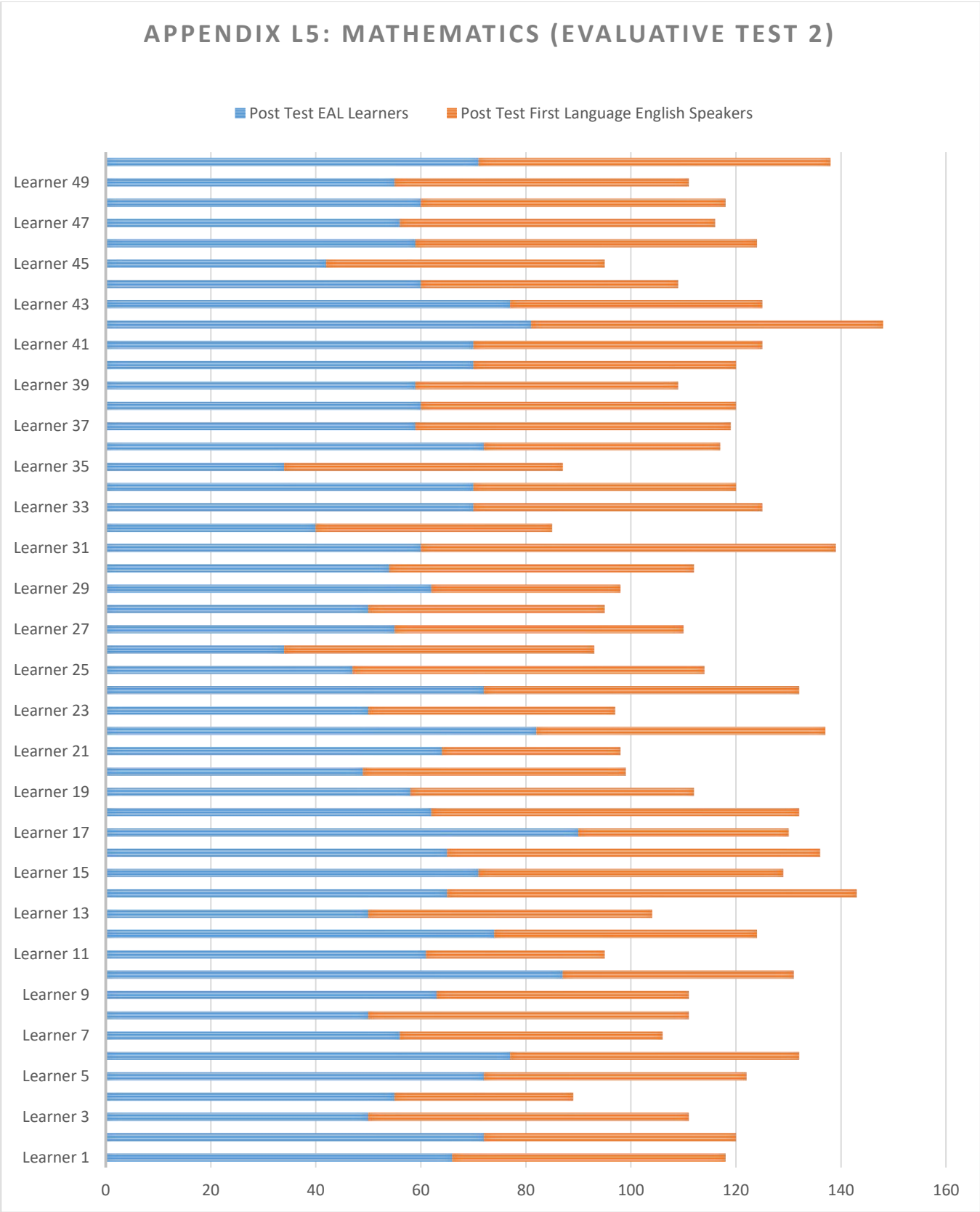
Appendix L4: Mathematics (Evaluative test 1)

Table 48



Appendix L5: Mathematics (Evaluative test 2)

Table 49



INTERPRETATION:

The above tables show the respective comparisons between the test results of EAL learners and First Language English speakers for mathematics evaluative test 1 (before the consistent and structured use of TEL practices) and evaluative test 2 (after the use of consistent structured TEL practices).

From the above comparisons, we can conclude that maximum number of EAL learners and First Language English speakers are benefited from Technology Enhanced Learning practices.

The graph above shows the graphical representation of the tabular data above.

Appendix L6: English

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 1	12	61	30	63
Learner 2	20	50	41	52
Learner 3	15	77	34	70
Learner 4	30	52	35	51
Learner 5	22	49	30	60
Learner 6	40	55	50	58
Learner 7	34	63	52	71
Learner 8	24	50	36	66
Learner 9	44	62	51	63

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 10	32	61	49	59
Learner 11	5	45	25	67
Learner 12	18	50	34	60
Learner 13	33	49	47	55
Learner 14	25	60	29	65
Learner 15	30	55	43	69
Learner 16	17	53	32	70
Learner 17	40	60	44	65
Learner 18	20	56	30	59
Learner 19	14	73	22	70
Learner 20	40	49	50	55
Learner 21	19	56	38	60
Learner 22	32	67	47	76
Learner 23	26	62	30	75
Learner 24	30	55	40	60
Learner 25	29	51	32	54
Learner 26	44	60	46	62
Learner 27	49	34	60	50

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 28	34	56	41	60
Learner 29	41	77	59	80
Learner 30	45	56	55	62
Learner 31	16	49	43	50
Learner 32	32	66	43	63
Learner 33	26	72	37	75
Learner 34	40	77	45	76
Learner 35	34	62	50	59
Learner 36	27	45	35	50
Learner 37	13	57	23	59
Learner 38	32	54	36	60
Learner 39	29	80	30	78
Learner 40	35	48	43	59
Learner 41	45	65	47	66
Learner 42	31	55	44	71
Learner 43	38	70	43	75
Learner 44	39	48	46	50
Learner 45	35	56	40	57

	Evaluative test 1		Evaluative test 2	
	EAL Learners	First Language English Speakers	EAL Learners	First Language English Speakers
Learner 46	34	60	50	66
Learner 47	25	65	30	71
Learner 48	45	61	51	64
Learner 49	38	50	50	57
Learner 50	40	62	67	69

INTERPRETATION:

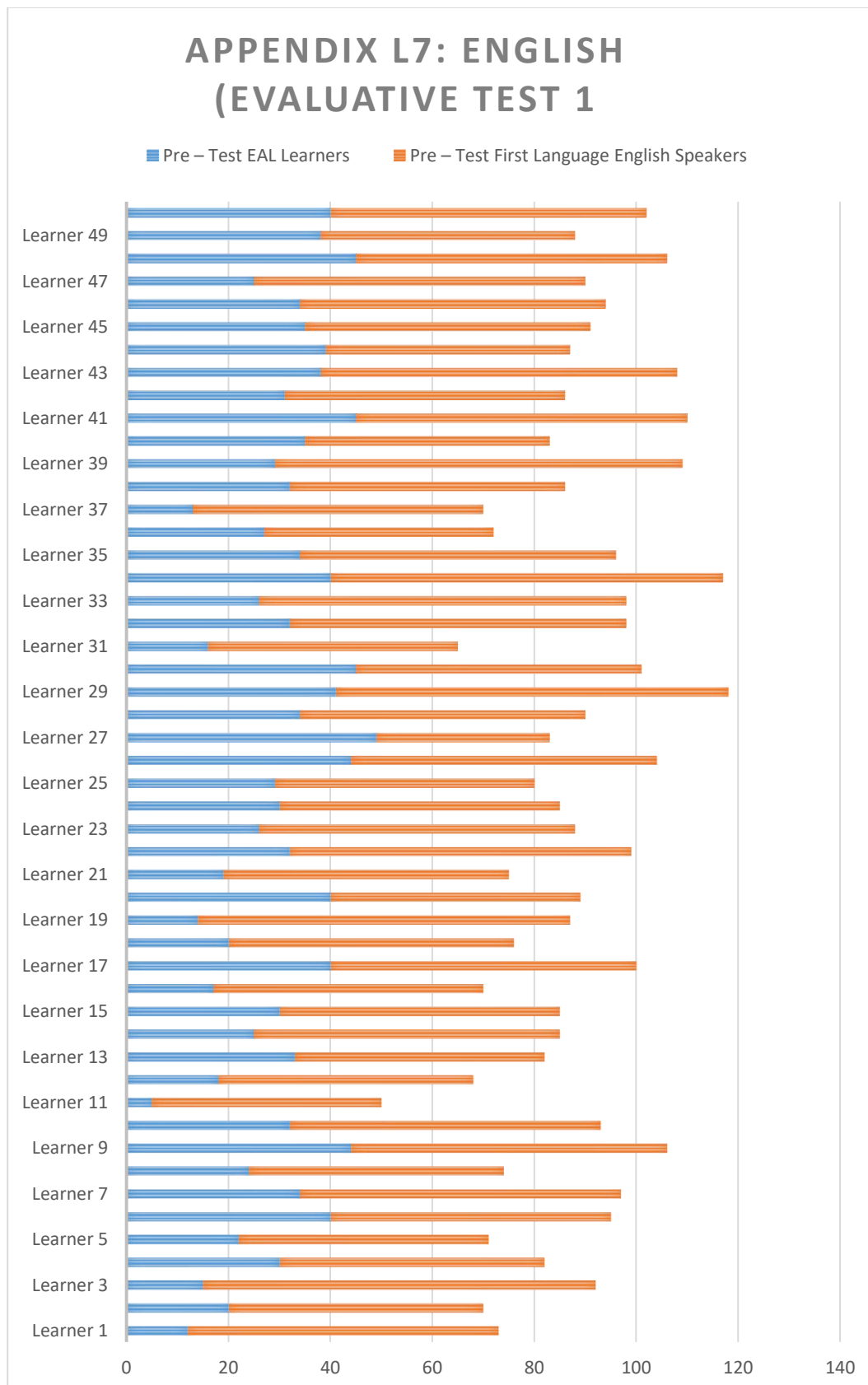
The above tables show the respective comparisons between the test results of EAL learners and First Language English speakers for English evaluative test 1 (before the study) and evaluative test 2 (after the study).

From the above comparisons, we can conclude that maximum number of EAL learners and First Language English speakers are benefited from Technology Enhanced Learning practices.

The graph below shows the graphical representation of the tabular data above.

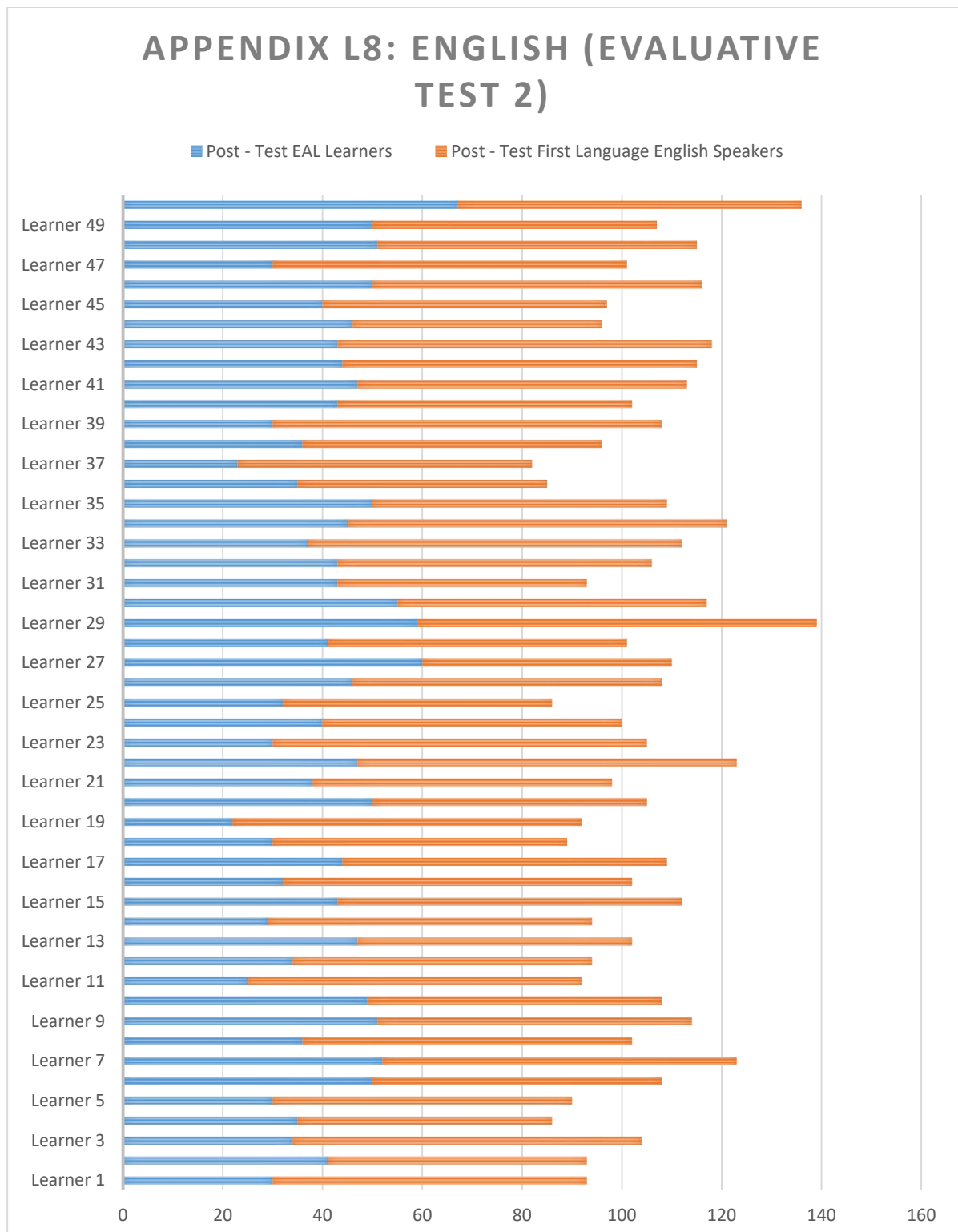
Appendix L7: English (Evaluative test 1)

Table 50



Appendix L8: English (Evaluative test 2)

Table 51



Appendix M – Pilot Study

PILOT STUDY (LEARNERS)

Appendix M1: Data Analysis –Learners Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
-.222	-.088	34

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item coding.

Here, the value for cronbach alpha = -0.222

This indicates very poor level of internal consistency. Hence, we conclude that the pilot study is insignificant here.

Appendix M2 -Data Analysis – Teachers Reliability Statistics

PILOT STUDY (TEACHERS)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
-4.714	-.004	11

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item coding.

Here, the value for Cronbach alpha = -4.714

This indicates very poor level of internal consistency. Hence, we conclude that the pilot study is insignificant here.

Appendix M3: Data Analysis – Observation Schedule Reliability Statistics

PILOT STUDY (OBSERVATION SCHEDULE)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
-.251	-.020	63

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item coding.

Here, the value for Cronbach alpha = -0.251

This indicates very poor level of internal consistency. Hence, we conclude that the pilot study is insignificant here.