

The Kent Speech Link Project: using a Multi-media Package to Support Speech Impaired Children

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The Education, and Speech and Language Therapy departments in Kent, South East England identified the need to use I.T to produce a systematic approach to supporting speech impaired children. An iterative development process which relied on design, feedback from users, and redesign was used. Three research processes ran in parallel; checking user interface usability, reviewing the computer program algorithm used to mimic the Speech and Language Therapist's (SLT's) decision making; and monitoring the ability of teaching assistants to listen accurately to children's speech. The resulting Speech Link multi media package consists of a speech screening assessment on CD-Rom. The web site features a full range of speech sound programs, information on sound development, a discussion group and on line support from a local Speech and Language Therapist. The video features SLTs modeling therapeutic activities linked to the 7 stages of sound remediation identified in the sound programs.

Introduction

Across Britain the delivery of services to school aged speech and language impaired children has been variable. Speech and Language Therapists are largely employed by Health and deliver a service to Education. Law et al (2000) reported 'little sense of joint strategy between Health and Education in the planning and delivery of services for children with speech and language needs'. The model of Speech and Language Therapy service delivery in mainstream schools has been largely consultative, where the Speech and Language Therapist (SLT) assesses, recommends programmes, and the teaching assistant implements the recommended programmes.

A project between Medway Speech and Language Therapy service and the Kent Education Service focused on the empowerment and skills development of teaching assistants carrying out speech programmes in school. All stakeholders were engaged in a multifaceted needs analysis of the school based assessment and management of children with developmental speech problems. The main themes were that the Speech and Language Therapy service was overstretched, and could not attend every school on a regular basis. Schools required help to decide who to refer. For children with less serious speech difficulty, schools needed to be better skilled and empowered to offer them support. Better materials were needed to support speech sound programmes and schools needed easy access to a SLT to ask simple questions. The Speech Link multimedia package was developed to meet the needs that were identified.

Gasgoigne (2006) reported that the matching of trained skills with appropriate speech tasks was integral to the development of speech and language delivery in schools. The Speech

Link approach is pragmatic in aiming to use the correct skills at the appropriate levels i.e. to train Teaching Assistants (TAs) to support the child with delayed speech with back up from their local SLT.

The aim of the speech package is to enable schools to screen for developmental speech difficulties and implement speech sound programmes. It consists of a screening assessment on CDROM, a training video, printable resources and a website featuring speech sound programmes and discussion group with on line SLT support. The sounds assessment consists of about 40 engaging and age appropriate pictures presented on screen, and takes approximately 10 minutes to administer. The child names the picture and the teaching assistant listens and codes in the child's response. At the end of the assessment the computer interprets the child's responses accordingly. It then recommends speech programmes with a suggested order of work. If the child has a complex difficulty a referral to SLT is recommended. The materials are designed to engage parents and school in the remediation of a school aged (4 to 8 years) child's delayed sound system.

A range of speech sound programs and resources to use with the programs is available to the TA to use with children in school. There is advice and information regarding speech development, and a video demonstrating SLTs using appropriate treatment approaches following the 7 stages recommended in the speech sound programmes. A discussion group providing a direct internet link to the local Speech and Language Therapy department offers the back up and support that is required.

Methods

The methods used in this study can be considered in four related developments. A Speech and Language Therapist was modeled in order to create a computer based speech sound screen and supporting materials including a web site and training video were developed. A pilot study was then conducted to test the validity of the speech sound screen when used by teachers or teaching assistants. Following the pilot a system was devised to facilitate collaborative practice between SLT's and schools. Finally post hoc qualitative analysis was conducted by questionnaire and external evaluation by the Institute of Education, University of London was also carried out.

Development of the Materials

When developing the materials the main objective was to model the therapist's decision making process, and produce a computer based speech sound screen which would adequately match an experienced therapist's recommendation for a given child. Thought was given to IT literacy as from the start of the project it was apparent that levels of IT ability among teaching assistants and teachers varied considerably. Access to IT was also considered. Software and hardware platforms varied between schools so the materials had to run in very different setups. A series of prototypes were developed. The first one was piloted, and the information gathered used to create the subsequent version. This led to a fairly rapid, iterative development cycle, where a total of five cycles were completed.

Pilot Study Design

Data were collected from 87 Teaching Assistants (TAs) from 38 different schools in West Kent. They represented a broad range of experience, knowledge and skills. Each participant was asked to complete a questionnaire prior to carrying out the speech screen. They used the Speech Link speech screen with two pupils. Each participant was also asked to complete a second questionnaire after two terms work using the Speech Link package. Following a one hour training session each TA was asked to administer the screen to two pupils individually. Data were collected for the second pupil only. The SLT transcribed the child's actual responses and the TA's coding for each item in the screen. The SLT was also asked to make their recommendation before recording the recommendation made by the Speech Link screen. These data were used for matching purposes.

Post hoc analysis of the impact of the Speech Link program (which is used in 92.4% of Kent Primary schools) was achieved via external evaluation lead by the Institute of Education, University of London. They conducted a small qualitative study, interviewing via telephone, Special Needs Teachers or TA's who had been trained to use the programme. Questionnaires were used to elicit the views of Speech Therapy Managers.

Results

Results from the study were considered in terms of the main areas measured; TA's coding accuracy and matching between the screen and the SLT's opinion. Quantitative and qualitative data are presented.

Coding Analysis

The results for TA's coding accuracy are shown in Table 1 and Figure 1.

Table 1: Percentage of sounds coded correctly and incorrectly by TA's

Sounds coded	Raw Score	%
Total correctly coded	4657	99.1
Total coding errors	43	0.9
First sound correct coding	2853	99.3
First sound coding errors	18	0.6
Last sound correct coding	1812	99.1
Last sound coding errors	15	0.8

Overall the TA's could accurately code a child's responses on the Speech Link speech screen. Little difference was found between coding initial or final sounds. Although most TA's did not make any errors a small proportion did make errors.

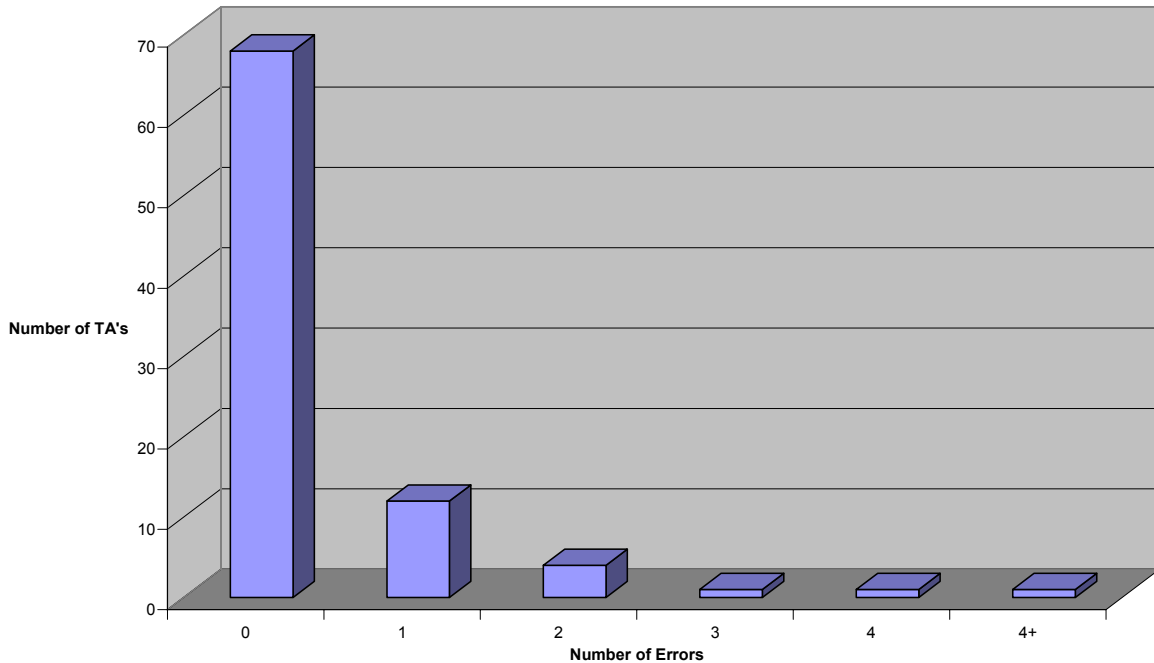


Figure 1: **Number of coding errors made by TA's**

A very small number of TA's made more than one coding error. The data showed that TA's tended to improve coding accuracy with practice. The effects of coding errors on the recommendations of the screen were considered; 84% of these errors did not affect the recommendations of the screen. The errors were not word specific and there was little difference between initial and final sounds. The most common error was to code 'other' as a response when the child had said one of the options shown.

Matching Analysis

The results for the level of agreement between the Speech Link speech screen and a Speech and Language Therapist are presented in Table 2.

Table 2: **Level of agreement between speech screen and SLT opinion**

Level of Matching	Raw Score	Percentage
Full Match	69	79.3
Partial Match	4	4.6
No Match	15	17.2
Match without coding error	3	3.4
No Match caused by coding 'other' responses	11	12.6

For the purposes of analysis a full match was awarded when the recommendations were identical or when the SLT recommended 4+ programmes and the screen recommended referral to SLT service. A partial match was awarded when the screen recommended 1 additional programme to the SLT. No match was awarded when the SLT recommended 1

additional programme to the screen or when the SLT recommended less than 4 programmes but the screen recommended referral to SLT service. The results show that overall there was a high level of agreement between the screen and the opinion of a SLT with 84% of the screens matching or partially matching the SLT opinion.

Table 3 shows the differences between screen and SLT opinions. The assessment tended to be over cautious. No severe children were missed but referral was recommended for some children who had minor problems. Very few programmes were recommended when not required.

Difference	Raw Score
SLT referral recommended but not needed	13
SLT referral needed but not recommended	0
Programme recommended but not needed	3
Programme not recommended but needed	1

Table 3: Differences between screen and SLT opinion

Post hoc analysis: Speech and Language Therapy Managers

Speech and Language Therapy Managers across Kent (N=5) responded to a questionnaire about the use of Speech Link in their areas and their general views about Speech Link. Table 4 shows the average rating given to aspects of the Speech Link package.

All managers reported that Speech Link is being used regularly in schools. The Speech Link SLT spends on average 30 to 40 mins a week supporting their schools on line. Speech and Language Therapy Services reported more appropriate referrals (75%), better partnership working (75%), and better use of expertise and skills (75%). All the managers questioned said they would recommend the Speech Link programme.

Speech Link Sounds Screen	8.7
Speech Link Speech Programmes	8.0
Resources to use with speech programmes	9.3
Video: SLTs modelling therapeutic activities	8.3
Website	8.37
Discussion group between SLT and schools	6.25

(Scale 1= poor to 10= excellent)

Table 4: SLT Managers average ratings of different aspects of Speech Link multi-media package.

It was reported that some TA's needed more support than others to carry out the speech programmes. This raised the issue of training and on going support. It was generally felt that a training programme was needed to run along side Speech Link to refresh TA's skills and allow for changes in staff.

The Speech Link pack was well received by Speech and Language Therapy managers. For example one manager reported that Speech Link was ‘extremely innovative and valuable, when used properly it saves valuable therapy time which can then be focussed onto the children with severe problems’, ‘a good resource for schools and staff’. Most thought that Speech Link helped to encourage greater partnership working and raised awareness of speech problems in mainstream schools.

Post hoc analysis: External Review of Schools by the Institute of Education

The qualitative analysis of the interview data lead to a report of findings regarding schools views of the Speech Link Pack across Kent Primary Schools. Speech Link was described as an important initiative, and it was universally agreed that Speech Link was valuable for assessment...‘you can assess and know where to go.’ Referrals to Speech and Language Therapy were agreed to have reduced and to be more appropriate. Schools felt empowered to use the Speech Link programmes with children while they waited for the SLT’s visit. Schools reported Speech Link had improved schools practise in the area of speech, ‘it has improved our whole approach: we are now more focussed, involved in close monitoring, looking and reviewing’. The respondents commented that most pupils made substantial progress when following Speech Link programmes. It was thought to be a good professional development and teaching tool for TA’s. TA’s reported their confidence in using the tool, it was strongly supported that the resources were appropriately designed for the use of teaching assistants.

The development of communities of learners is an important initiative and e-discussion groups, as found in Speech Link, are thought to be good. The researchers found that like many other initiatives with e-discussion groups, this element of Speech Link was not hugely valued.

Report Summary

Respondents ‘felt that Speech Link was a well designed, well supported programme which did the job it was designed for, helped build bridges between schools and Speech and Language Therapy services and supported inclusive mainstream practice in supporting children with speech impairment’.

Discussion

Evidence suggests that the iterative developmental process was appropriate; the trial, review and remodel process over a period of time allowed themes to develop and be explored thoroughly. Responding to feedback from schools and SLTs, ensured that the programme was user friendly, and functional. Children responded positively to visual materials presented on a computer screen. The main concern of the research team was the ability of the TA to accurately listen to and record a child’s sound system. Piloting demonstrated that this was an unfounded concern. Generally with training TA’s listen well. The computer model used to recommend programmes or referral to Speech and Language Therapy has been shown to be consistent with experienced SLTs’ decision making. The need to use systematic

developmental age norms for sound development, Dodd et al (2003), was identified in the early stages of piloting and as this has been integrated into the assessment robustness has improved. Schools need to be encouraged to involve parents in the delivery of programmes and speech review. The package is designed to be parent friendly and easy to follow, and the back up of the school should develop stronger parent/school partnerships. This area requires further analysis and emphasis.

The package seems to be successful at encouraging better use of expertise and skills, helping schools and local SLT services to prioritize children, and deliver appropriate intervention. It needs to be embedded into the systems in schools and SLT services to ensure that there is integration of philosophy and policy. Schools need to feel empowered to deal with the mild to moderate speech delayed child, while the dyspraxic or severe phonologically disordered child can access specialist SLT support. This has strong implications for future strategy and delivery of Speech and Language Therapy services to schools. Speech Link can act as a catalyst for change where waiting lists/times are high and school children have found it difficult to access appropriate therapy. The impact that Speech Link is having on the overall skills level of the school is encouraging and really important. Peacey et al (2006) report that Speech Link is having an impact on individual pupils, and school wide special education needs practice.

It was interesting to note that schools and SLT managers did not rate highly the discussion group with facilities for online support. Peacey et al (2006) noted their importance in the development of 'communities of learners' which are an important development in successful projects. He also noted that across the board such forums are not that popular, and that people often relied on face to face or telephone connections rather than internet contact. Some people it seems still do not feel comfortable with electronic media, but one would hope and expect that with time this modus operandi will become more comfortable for all. Certainly, the external evaluation suggests that the thinking behind e-media is sound, but more encouragement/training may be needed for it to reach its full potential. The vision of using e-media to offer immediate meaningful communication between the classroom and the SLT is not fully realised yet, but has potential.

While speech is the most obvious area of intervention, an area that would have the greatest impact on children's ability to access learning in the classroom is receptive language. Conti-Ramsden (2000) reports that the number of potential cases of primary speech and language delay is high (median 5.95%). We need to respond to this need and develop a receptive language screen and intervention pack to target school arrivers. If this pack offered assessment and therapeutic packages for teachers and TAs it could be a great asset. The data sets of receptive language ability could allow important analysis of whole class receptive language scores. It would offer statistical analysis of the language of whole cohorts of school arrivers, and help in the prioritisation of resources. Teachers would have greater opportunity to assess the influence of poor receptive language levels on school attainment, and to intervene earlier. The impact of this work will be reviewed and reported.

Acknowledgements

The Speech Link Team acknowledges the work of the SLT department at Medway Primary Care Trust in the early stages of the evolution of the pack.

John Moore at the Department of Education Kent County Council; we thank him for his sponsorship and inspirational partnership working across the agency boundaries.

Nick Peacey and his team at London University for allowing us to use their evaluation report of the Kent Speech Link Project.

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