

Speech Therapy Applications for Special School

PART C PROJECT DETAILS

2012/0340 (Revised)

School Mission, Vision and Plan

Mary Rose School is a combined special school managed by the committee appointed by the Christ Church Council.

The mission of the School is to provide in the best possible environment all-round education to the targeted students enabling a more balanced development. We aim at teaching in accordance with the students aptitude and cultivate their personal accomplishment in order to nurture their sense of confidence, self-care and independence.

Our goal is to help them realize their full potential and foster their own uniqueness.

Our vision is our students can

- Enjoy learning in an environment full of encouragement and approval, which helps to build up their confidence;
- Show their potential talents through diversified and challenging courses;
- Learn to respect other people, care about the society, and become a good citizen;
- Come to know and believe in God, be positive and open to new experiences and, most importantly, give back to the society.

The School currently has a 3-year plan in store of which the target is in "Learning and Teaching", by reformation of curriculum and employment of information technology, the School is to enhance the quality of teaching so as to better fulfill the needs of students and to elevate motivation of learning whilst catering for individual diversity.

Current situation

1. Student population

As of 5/2013, there are a total of 26 classes, 12 moderate grade classes and 14 mild grade classes representing a total of 346 students. Their speech and language ability and communication needs vary. As a result, treatment will be provided by means of individual sessions, group therapies or special training of which bespoke objectives and targets are individually established.

During the academic year 2012-13, 150 students have received regular individual speech therapy services mainly in the area of receptive language, expressive language, articulation and social treatments. The number of students benefitted in these various categories are as follow: receptive language - 126, expressive language - 151, articulation - 44, as well as social - 145.

2. Speech Therapy Services

Treatments are delivered through traditional speech therapy activities including toy playing, art activities, card games, etc. Computers have been used quite extensively, for arousing student's motivation and interests. Better treatment outcome is evident. For instance, among the total 150 students who have received individual speech therapy services, 74 have

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used computer-based activities during the lessons.

Currently, for the benefits of our children, our speech therapists can choose from the ordinary commercial computer games from internet or coming in form of CDs to the games in the C-Rehab Resource Station, a website funded by the Hong Kong Jockey Club Charities Fund. Another recent choice is a few applications developed by the Heep Hong Society for training autistic children.

As pointed out above, our students vary with respect to communication ability and need, their learning impediment and characteristics naturally come in a wide range. It is therefore of paramount importance that treatments must be delivered with ample flexibility embracing a full faculty of speech therapy techniques so that learning outcome can be optimized. We are of view that the commercial games and apps are grossly inadequate in terms of complexity, choices of difficulty levels as well as functionality. Not to mention the necessary incorporation of appropriate speech therapeutic features and robustness of directing toward a wide range of specific treatment audience. Furthermore, most of them are unable to incorporate the local cultural context and often not be mediated in Cantonese.

3. Students performance

For this project, two key performance indicators are employed for measuring the students' performance, namely the treatment success rate and the motivation index. While the treatment success rate is defined as the percentage of trials when the student successfully achieved treatment targets, the motivation index is a non-quantitative measure given by the speech therapist-in-charge to indicate how motivated the student was during the lesson, out of a scale of 1-5: 1 indicates the least motivated and 5 indicates the most motivated.

A survey was done in May 2013 on the students at school, studying the treatment mode used for each student and their corresponding treatment success rate and motivation index. The result can be summarised as follows:

- The average treatment success rate of our students when therapies are conducted with traditional non-computer based activities and computer-based activities are 64.1% and 74.6% respectively, a 10% increment (16% higher) in using technology.
- The averaged motivation index are 3.8 and 4.4 for non-computer based activities and computer-based activities respectively, 0.6 points (16% higher) higher in using technology.

Conclusion: Computer-based activities clearly has its edge in arousing motivation and enhancing learning outcome.

Rationale for the Project and its compatibility with the School's development plan and HKSAR's 2013 Education Policy

The development of locally developed Cantonese speech therapy apps is proposed in this project, based on the following:

- a. Benefits of using computer technology in teaching to enhance motivation and learning outcome.

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- b. As supported by numerous researches on the effectiveness of mobile technology e.g iPad apps, it is more effective than the traditional desktop technologies in enhancing motivation, positively changing learning attitude leading to improvement in learning outcome.
- c. There is clearly evident limitation of the computer-based games and special education apps currently available for speech therapy purpose. They are inappropriate in terms of complexity, difficulty level, flexibility and application of speech therapy techniques.

Furthermore, HKSAR's 2013 Education Policy specifically emphasises on improving special school students' learning through the use of assistive technology. This dovetails with the School's current 3-year strategic development plan on the theme of "Learning and Teaching", which aims at using information technology to enhance teaching quality and student motivation.

Capability Assessment

At present, the School has 6 speech therapists with extensive speech therapeutical experience. They are all familiar with the students and the operation as well as the development of the School. They will be actively involved in the project during the apps development process as well as the subsequent usage and review of these apps upon their release.

For instance, one of them has been involved in designing the Hong Kong Augmentative and Assistive Communication Applications launched in December 2012, which was designed to support communication of children with language disabilities. The project leader has been with the School as a speech therapist for 7 years. She had worked in a senior management position in the banking sector prior to her career as a speech therapist, and has experience in working with IT personnel in implementing electronic banking systems, she will act as the liaison in this proposed project with software houses managing the whole implementation process.

Goals and Objectives of the Project

The long-term goal of the project is to enhance "Learning and Teaching" quality of the school by making use of mobile technology to better fulfill individual needs, to elevate motivation and to cater for individual diversity.

The short-term goal is to develop 3 Cantonese speech therapy apps as teaching tools..

The objective of the project is

1. To achieve an average motivation index of 4.75 with these to-be-developed apps for treatments, which will result in 25% increase from current motivation index under the traditional speech therapy methods .
2. To achieve an average treatment success rate of 80% with these to-be-developed apps for

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treatments, which will result in 25% increase from the traditional speech therapy methods.

Target and Expected Number of Beneficiaries

The target of this project will be the students at the School. A recent survey on the speech therapists at the School, in addition to the existing 74 students who are already using computer-based activities for therapies, 86 more students are likely to use apps for therapies if available. Therefore, the number of targets of this project is estimated to be 160 students for the academic year 2013-14. Each year, around 25 new students will be admitted into our Primary One and they would then be likely to benefit from the to-be-developed apps going forward. Note that the apps could be distributed to speech therapists in Hong Kong

The potential number of targets could then be substantially increased the extent of which can be astonishing.

Innovation

The Cantonese speech therapy apps to be developed is a novelty idea in Hong Kong up to the date of the submission of this proposal. These apps possess the following unique characteristics as compared to the commercially available apps:

- i. Flexibility
 - a) Permitting selection of difficulty levels so as to cater for individual needs
 - b) Permitting selection of treatment targets so as to cater for individual needs and allowing fine tuning in treatment planning
 - c) Permitting selection of usage of different forms of cues or prompts so as to facilitate learning
- ii. Application of speech therapy techniques, different types of speech therapy techniques e.g. visual cues, will be incorporated in the apps
- iii. Incorporation of the local cultural and societal elements such as familiar local supermarket, restaurants, foods etc.
- iv. Multiple usage of the apps - one app can be used for more than one purpose .e.g training categorization skills as well as answering the “Wh-“ questions
- v. Availability of report functions so as to promptly capture various performance measures after each treatment session

The above can be illustrated in the following apps design

This is a transportation game to train categorization skills and object-place association knowledge. It is used for training Wh-questions asking, response to Wh-questions, articulation and verbal production.

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Conceptual Framework

With the advent of mobile technologies such as tablets, it opens up a new educational platform for learning offering a multimedia learning environment at your finger tips. Over and above the traditional desktop technologies, it offers superior flexibility and mobility and hence, redefining the time and place of learning. This new mode of interaction and application offers unprecedented potential of improving learning. The effectiveness of any apps for improving children's learning has been widely advocated by researches, in which numerous findings suggest increase in motivation, positive changes of attitude towards learning and possibility of dynamic assessment as the main reasons leading to the improved learning outcome. (Riconscente, 2011) (Culen et.al, 2011). Chiong et. al, 2010 states that one of the principles in designing apps is to focus content narrowly within a developmental age range. a huge variety of educational apps have been developed for children's learning, specially designed apps for special education and speech therapy can be designed to take advantage of learning through the use of these mobile devices so as to cater for the specific individual needs of this special population.

Implementation Plan with Time-line

Schedule of the Project

| Time | Activity | Details |
|----------------------------|---|--|
| Oct 21 – Nov 3 | Tender documents preparation Vendor sourcing | To ensure the apps will be developed with the best quality at the best price, open tender will be issued |
| Nov 4 – Nov 17 | Time for vendor to response to tender | |
| Nov 18 – Dec 1 | Tender review and vendor selection | |
| Dec 2 – Jan 12, 2014 | Detail functional design and development of initial prototype | Meetings will be held between the vendor and the School on details of the apps with the first prototype to be developed for review |
| Jan 13 – | Graphics and Program | Throughout the program development period, |

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| | | |
|------------------|----------------------------------|---|
| June 1 | development | many versions of the software from the vendor will be reviewed and tested by the School to ensure the development is on the right track |
| June 2 – June 15 | Program feedback and refinements | Speech therapists will review the program and provide feedback to the vendor for program refinement |
| June 16 – Jun 30 | Users Acceptance test | Speech therapists at the school will test the program with students and provide feedback for further refinement |
| July 1 – July 14 | appstore submission/approval | |
| Oct 1 – Jan 31 | Data Collection | Student performance data will be collected for project evaluation |

The apps will be developed throughout the academic year 2013-2014, data will be collected at the beginning of the academic year 2014-2015 for project evaluation.

Three apps will be developed, these apps have been reviewed by a software house, and confirmed the feasibility of developing such apps and the estimated costs involved in the development.

Teachers' and Principals' Involvement in the Project

The project will be led by one of the six speech therapists at the School. She will oversee the whole implementation process, including liaison with the software houses, monitoring the progress of the apps development, monitoring of the usage of the apps and collection of data for reporting. The other five speech therapists will be involved in the design of the apps, reviewing the apps in progress of development, giving feedbacks and suggestions on the apps during development and after release. All six speech therapists will use the apps as teaching tools. The Principal will supervise and provide guidance throughout the whole project implementation, She will meet with the speech therapy team regularly to review the progress of the project.

The following are the brief CV of the team members:

- 7 years of speech therapist experience with special school, 11 years of banking experience with 3 years in management position

- 21 years of speech therapist experience with special school

- 13 years of speech therapist experience with special school

- 12 year of speech therapist experience, 11 years with special school, 1 years with NGO

- 11 years of speech therapist experience, 10 years with special school, 1 years with NGO

- 4 years of speech therapist experience, 3 years with special school, 1 years with private clinic

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Budget*Budget of the project*

As the apps will be offered to the School and potentially other special schools for free, there will be no income to be generated. The following items are the expenditure to be incurred throughout the whole project, in HK Dollars. The cost listed for the Apps development is quoted by a software house.

| Category | Items | Unit cost | Description |
|---|--------------------------|--------------------------------|---|
| a. Equipment | | \$ 4,000x 5 | To facilitate usage of the app, 5 additional will be purchased |
| | Router installation | \$ 3,500x1 | For WI-FI connection in the speech therapy room, to allow report sending to parents |
| | Sub-total: | \$ 23,500 | |
| b. Services (Apps development and Training) | Project Management | \$ 12,000 x 3 (for 3 games) | Project manager fee to oversee the cooperation of program development, graphics design and training for the completion of the whole project |
| | Program Development | \$ 170,000 | \$40,000 per month, 4.25 months for 3 games |
| | Graphics Design | \$ 34,000 | Artwork \$100 per artwork |
| | Training | \$ 2,400 | Training to speech therapists in program usage |
| | Sub-total | \$ 242,400 | |
| c. General expense | Audit fee | \$ 5,000 | Audit fee |
| | App store management fee | \$ 800 | Standard fee charged by appstore for dissemination of program |
| | Sub-total | \$ 5,800 | |
| d. Contingency | | \$ 8,000 | |
| Grand total | | \$ 279,700 | |

Asset Usage Plan

| Category (in alphabetical order) | Item / Description | No. of Units | Total Cost | Proposed Plan for Deployment |
|-------------------------------------|--------------------|--------------|------------|--|
| computer hardware | | 5 | HKD 20,000 | Continue to be used by school for training purpose |

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| | | | | |
|-------------------|--------|---|-------------|--|
| computer software | apps | 3 | HKD 240,000 | Continue to be used by school for training purpose |
| Others | Router | 1 | HKD 3,500 | Continue to be used by school during training |

Expected Project Outcome

Upon completion of the project, 3 Cantonese speech therapy apps are expected to be produced. These apps will be installed into the iPads to be purchased with the project funding. The speech therapists at the School will use the apps during lesson to facilitate students' learning. Usage of specific apps will depend on the treatment goals and characteristics of specific students.

The project is also expected to bring forth significant intangible project outcomes, i.e. enhancement in motivation level and the improvement of treatment outcome of students' learning, which are to be measured by the motivation index and treatment success rate as explained earlier.

The intellectual property rights of the apps to be developed will belong to Quality Education Fund.

Project Evaluation

The effectiveness of the project can be measured by two performance indicators, namely the motivation index and the treatment success rate. The former is a qualitative measure given by speech therapists-in-charge to indicate how motivated the student was during the lesson, out of a scale of 1-5: 1 indicates the least motivated and 5 indicates the most motivated. The second measure the percentage of trials that the student successfully achieved treatment targets.

In May 2012, baseline was established. This includes an average motivation index of students for non-computer-based therapy, an average motivation index of computer-based therapy, an average treatment success rate for non-computer-based therapy and an average treatment success rate for computer-based therapy. We also recorded the total number of students using computer-based therapy based on the information collected and provided by the speech therapists at the School. The collection of these data points serves as the benchmark for comparing the changes in treatment outcome (by treatment success rate), motivation level (by motivation index), and level of impact (by number of targets using the apps). Upon launching of the apps, a report will be generated after each lesson using the report generating function of the apps after each usage. The speech therapist will be required to indicate the motivation level of the student in that particular lesson by assigning a motivation index. This information will be collected for later report generation. Progress report will be generated once every three months following the launch, reporting the total number of sessions where the apps were used – as an input analysis, the total number of students using the apps – as an impact analysis, average treatment success rate and average motivation index – as an outcome analysis. The outcome will then be compared against the

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benchmark set in the objective of the project.

Sustainability of Project Outcome

This project will likely open up a new mode of teaching for speech therapy as well as the special education in Hong Kong. With the advancement of technology, it opens up more efficient and effective ways for teaching. The apps to be developed will allow speech therapists to utilize technology for better teaching whereas the special design of these apps will cater for the special needs of students in special schools.

The apps are also expected to have a reasonable shelf life even without further funding.

Dissemination/Promotion of Project Outcome

The apps are to be distributed to our speech therapists and then shared with other speech therapists in Hong Kong so as to maximize the impact and benefits.

Report Submission Schedule

My school commit(s) to submit proper reports in strict accordance with the following schedule :

| Project Management | | Financial Management | |
|--|----------------|--|----------------|
| Type of Report and covering period | Report due day | Type of Report and covering period | Report due day |
| Progress Report 1/12/2013 - 31/5/2014 | 30/6/2014 | Interim Financial Report 1/12/2013 - 30/11/2014 | 31/12/2014 |
| Progress Report 1/6/2014 - 30/11/2014 | 31/12/2014 | Final Financial Report 1/12/2014 - 31/3/2015 | 30/6/2015 |
| Final Report 1/12/2014 - 31/3/2015 | 30/6/2015 | | |

Reference

Chiong C. & Shuler C., Learning: Is there an app for that? Investigations of young children's usage and learning with mobile devices and apps. The Joan Ganz Cooney Center, 2010.

Culen A. & Gasparini A., A New Classroom Technology? A report from two pilot studies, *Information Sciences and e-Society*, 2011

Riconscente M., Mobile Learning Game Improves 5th Graders' Fractions Knowledge and Attitudes, GameDest Institute, 2011.