

ANNEX C – LEARNING ON THE MOVE (LOTM) TOOLS

1. INTRODUCTION

- 1.1 Currently, many schools embark on field trips (learning trails) for various subjects to allow students to experience experiential learning and authentic learning outside of the classroom. Schools normally have to engage service providers to organise and conduct these field trips which are mostly pen and paper based and may not fully meet the requirements of the curriculum.
- 1.2 Existing tools for creation of learning trails are mostly proprietary and trails created using these tools can only worked with one or a few specific devices. Teachers and students who want to embark on these trails are therefore dependent on the availability of specific type and model of dedicated devices that support the tools. Where there are a specific number of dedicated devices provided by the trail service operator for use during the trails, there would be a limit to the number of users who can experience the trails at the same time. Furthermore, teachers and students find difficulties in using the tools because they are not intuitive and tedious to use.
- 1.3 During the earlier pilots that involved the development of learning trails at the Sungei Buloh Wetland Reserve, it was discovered that there were challenges faced in the development of learning trails in locations with dense vegetation. The use of WiFi network is not conducive in such environments as it was expensive and technically challenging to trench and lay network cables and setup of wireless equipments to establish the WiFi network.
- 1.4 A key technology design consideration for learning trails is to leverage the pervasive mobile network. However, such networks will also have its associated challenges, such as high data access charges incurred by individuals for data transfer and connection to the web.
- 1.5 To address the gaps and challenges in trails creation, IDA would like to invite industry to submit proposals to develop innovative, 'easy to use' and easily accessible LOTM Tools for the creation of learning trails by teachers and students for Learning & Teaching. Industry is welcomed to propose solutions that will help to overcome the infrastructure challenges mentioned above.

2. OBJECTIVE

- 2.1 The objective of this part of the CFC is to encourage the development and piloting of “easy to use” LOTM Tools for the creation of learning trails to enable experiential and authentic learning for students.

3. SCOPE

- 3.1 Participants are to submit proposals with the following phases and deliver the project within the estimated schedule as indicated in the following table.

<u>Phase</u>	<u>Description</u>	<u>Expected Deliverables</u>	<u>Estimated Schedule *</u>
1. Project Development	<ul style="list-style-type: none"> ○ Gather users' requirements (e.g. activities leading to achievement of key learning outcomes) from MOE and selected schools identified by IDA ○ Develop the tools and components according to user requirements & CFC scope in clauses 3.1.1 to 3.1.9 and 4.1 under CFC Public Document-ANNEX C ○ Conduct Users Acceptance Test ○ Assist IDA and its designated partner(s) in the Impact Study 	<ul style="list-style-type: none"> ○ User requirements specifications ○ Developed LOTM Tools ○ Users Acceptance Test sign-off ○ Inputs to impact study 	Oct'10 – Apr'11 (6 months)
2. Authoring of Learning Trails	<ul style="list-style-type: none"> ○ The creation of the learning trails (as detailed in ANNEX C1-3) would be separately procured. ○ Participants can submit a separate business proposal (including <u>manpower rates</u>, refer to Appendix B5 under CFC proposal form B) for trails creation. ○ Assist MOE-designated partners to create at least 2 learning trails to demonstrate how the developed LOTM tools can easily create learning trails. ○ Assist IDA and its designated partner(s) in the 	<ul style="list-style-type: none"> ○ At least 2 learning trails are successfully created by MOE-designated partner ○ Inputs to impact study 	Mar'11-Jul'11 (5 months)

	Impact Study		
3. Pilot of Learning Trails	<ul style="list-style-type: none"> ○ Pilot at least 2 learning trails with at least 4 selected schools with each learning trail used by at least 2 selected schools of up to 2 classes per school identified by IDA ○ To demonstrate how the developed LOTM tools support the creation of learning trails to achieve the key learning outcomes for LOTM ○ Refine and enhance tools based on users' feedback ○ Assist IDA and its designated partner(s) in the Impact Study 	<ul style="list-style-type: none"> ○ Pilot at least 2 learning trails with at least 4 schools ○ Refined/enhanced Tools ○ Inputs to impact study 	Aug'11- Dec'11 (5 months)
4. Project Closure & Report	<ul style="list-style-type: none"> ○ Deliver a report on the results of the pilot, key learning points and implementation considerations ○ Deliver a Case Study to describe how the developed LOTM tools have helped meet the users' needs for LOTM projects ○ Assist IDA and its designated partner(s) in the Impact Study 	<ul style="list-style-type: none"> ○ Report on pilot results, key learning points and implementation considerations ○ Inputs to impact study ○ Case Study 	Jan'12- Apr'12 (4 months)

**Subjected to confirmation after the award*

3.1.1 As shown in **Figure 1**, the LOTM tool shall support the following authoring, monitoring and tracking features. This shall be offered as a web-based application. Alternative feasible ways of implementation can also be proposed.



Figure 1. LOTM Tool

i. Trail Authoring

- a) Create a structured trail route with content (pictures, videos, audio, text information etc.) and activities at an authentic location.
- b) Package assessment activities (e.g. quiz, survey, game or any other on-site activities) within the trail to assess students' learning and aggregate responses.
- c) Include digital mapping to define trail route and navigation from point to point with visual reference (e.g. SLA OneMap).
- d) Include an emulation view to allow author to view how the trail would look like on the mobile devices.

ii. Trail Usage

- a) Monitor and track the progress of students during the trail, allow communication between users (teachers and students) and provide online help.
- b) Conduct analysis and track students responses and results arising from assessment activities performed during the trails.
- c) Track students' location during the trail.

3.1.2 The LOTM tool shall minimally allow the authoring of the trail which can be accessed from a mobile website. These web-based trails shall be accessible from a web

browser. The web-based trails shall be hosted on a central web site designated by IDA for access over wireless networks (such as Wireless@SG) and mobile data networks.

3.1.3 In addition, Participants shall also propose for the tool to allow the authoring of the trail which can be downloaded as an application onto a computing device. These client-based trails shall be hosted on a central web site designated by IDA for downloading and installation onto the computing device.

3.1.4 Both web-based and client based trails are expected to have features that have sufficient elements of interactivity. Client-based trails shall have higher levels of interactivity. Participants shall propose the interactivity levels for the proposed solutions based on the following table:

Level	Name	Description
1	Passive	<ul style="list-style-type: none"> • Learner acts as a receiver of information. • Learner interacts with the trail content using navigational buttons (browsing).
2	Limited interaction	<ul style="list-style-type: none"> • Learner makes simple responses to instructional cues. • Scenario-based multiple choice.
3	Complex interaction	<ul style="list-style-type: none"> • Learner makes multiple, varied responses to cues. • Complex interactions requiring text entry boxes and manipulation of graphic objects.
4	Real-time interaction	<ul style="list-style-type: none"> • Life-like set of complex cues and responses. • Learner is engaged in a simulation that mirrors work situation.

3.1.5 Participants shall include in the proposal a table comparison on the different features to be proposed for the web-based and client-based options. Refer to **Clause 5 of this Annex** on examples of user scenarios for LOTM Tool and trail usage.

3.1.6 The following table below indicates the targeted computing environments. The web-based and client-based trails shall adhere to the specifications stated:-

S/N	Trails	Mobile Devices	Full size portable devices (Notebook/Netbook)
1	Web-based Trails	<p><u>a) Supported by default mobile browsers on all of the following platforms:</u></p> <ul style="list-style-type: none"> • Windows Mobile • Symbian • Apple iPhone • Research in Motion (Blackberry) • Android 	<p><u>b) Supported by the following browsers:</u></p> <ul style="list-style-type: none"> • Internet Explorer 7 • Safari 3 • Firefox 3.0
2	Client-based Trails	<p><u>a) Supported on at least 2 of the following platforms:</u></p> <ul style="list-style-type: none"> • Windows Mobile • Symbian • Apple iPhone • Research in Motion (Blackberry) • Android 	<p><u>b) Supported by the following OS:</u></p> <ul style="list-style-type: none"> • Windows Vista • Windows 7

3.1.7 Participants shall propose the mobile device model(s) that would be supported by the client-based trails.

3.1.8 For both web-based and client-based trails, Participants shall propose the method for location-based functionalities in the LOTM tool. This functionality shall enable location information to be embedded into the trail content as well as to be used and retrieved during the usage of the trails. These location-based functionalities shall minimally include

- Teacher tracking of students' location during the trail usage;
- Triggering of activities at specified designated locations; and
- Student navigation during usage of the trail.

3.1.9 Besides the need to develop the components and features of the LOTM tool as indicated in the above scope, Participants are welcomed to propose any other unique features or components.

3.2 Awarded Consortium shall provide IDA and MOE free access to the developed LOTM Tools for a minimum period of 1 year after successful completion of project for at least 300 users. Participants shall also include in the proposal the business plans and models for long term sustainability, mass deployment and overseas commercialisation of the LOTM Tools. Participants shall provide the pricing models as indicated in CFC Proposal Submission Form B-Appendix B3). In addition, participants may propose alternative pricing models.

4. DESIGN APPROACH

4.1 Participants shall consider the following in the design and implementation of the LOTM Tools:-

4.1.1 Web-based and easy to use (for Trail Authoring)

4.1.1.1 The LOTM Tool shall be web-based for ease of authoring of trails by teachers and students via access over the internet. Alternative feasible ways of implementation can also be proposed.

4.1.2 Minimising dependency on dedicated infrastructure

4.1.2.1 The web-based trail or client-based trail application created must be able to use the connectivity provided through the mobile device to upload artefacts captured (e.g. pictures, videos and voice recordings) and submit assessment activities completed by students.

4.1.3 Minimising Data Access Cost

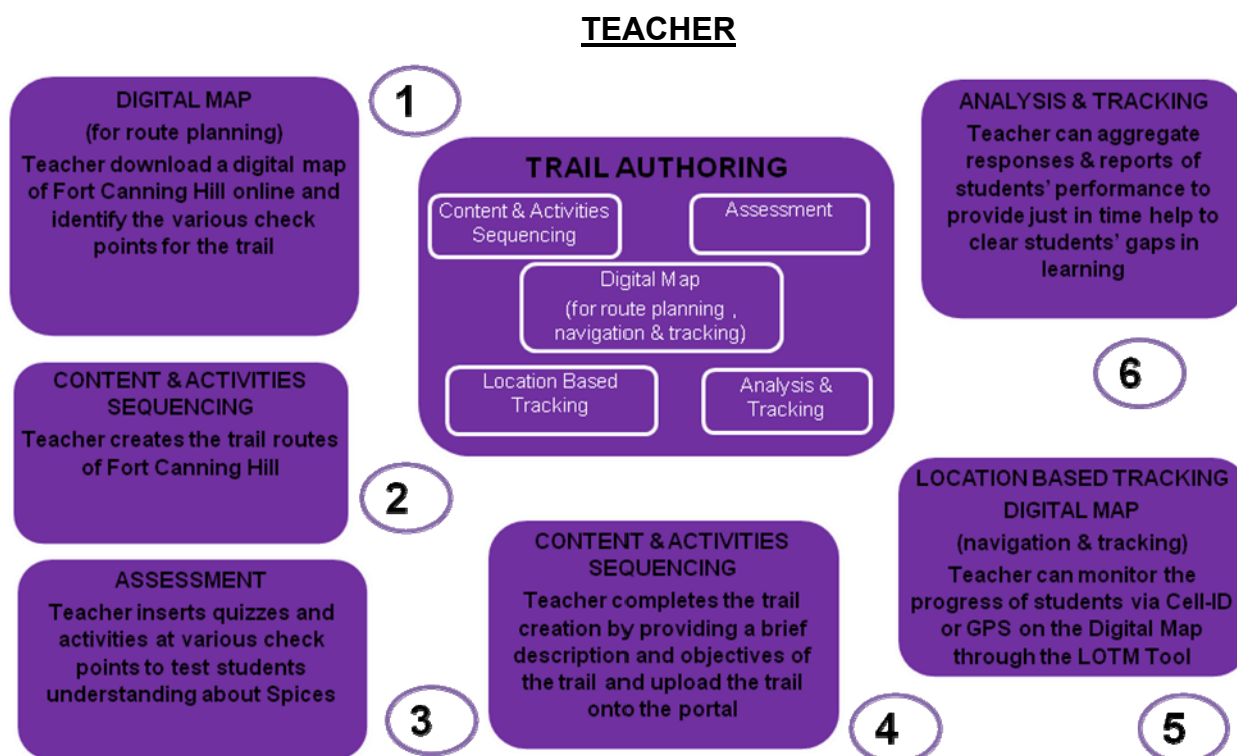
- 4.1.3.1 Participants are encouraged to propose solutions that minimise the usage of wireless data connectivity.

4.1.4 Technology Refresh

- 4.1.4.1 Participants shall propose how to address technology refreshes (e.g. obsolescence of supported devices) in your proposal.

5. USER SCENARIOS

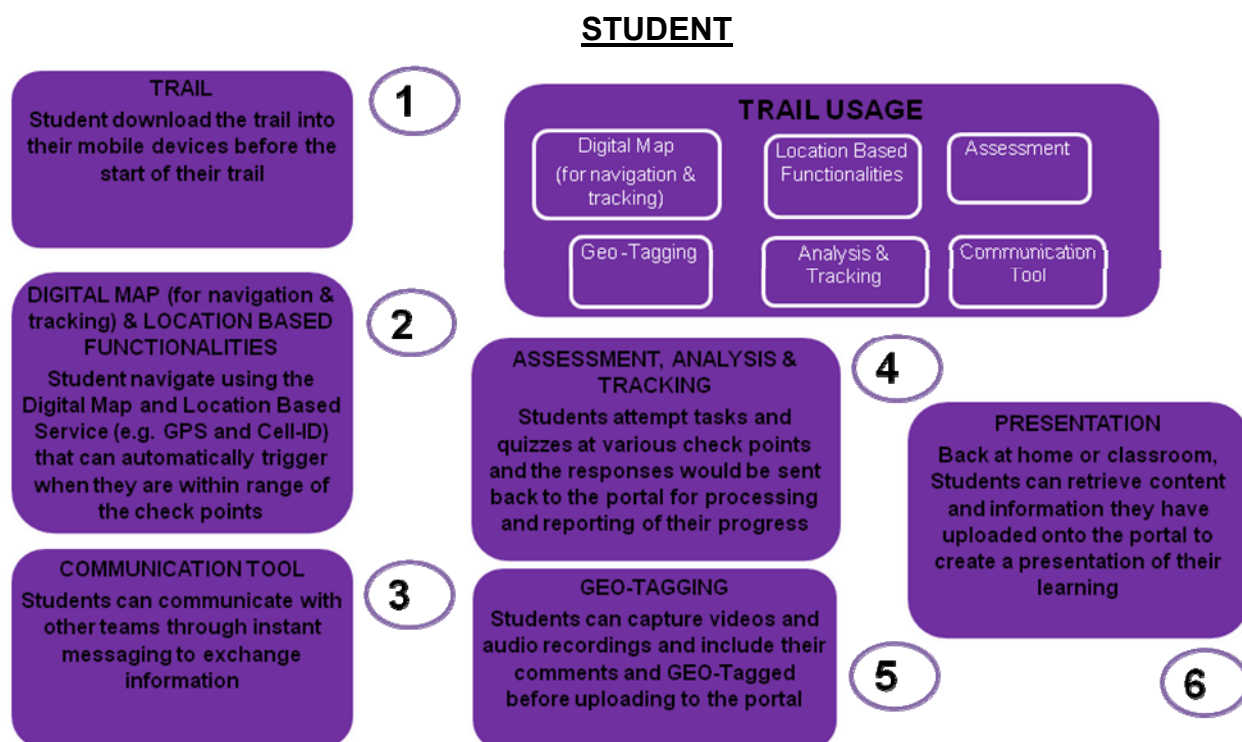
- 5.1 The following user scenarios are examples of how the LOTM Tool would be used.



5.1.1 User Scenario for Teacher

- Step 1: Teacher wants to create a learning trail of the Spice Garden at Fort Canning Park. Teacher accesses the LOTM Tool from an online portal and downloads a digital map of Fort Canning Park from NParks website into the LOTM Tool.

- Step 2: Using the Trail authoring feature within the LOTM Tool, Teacher marks out a few routes of the trail by identifying a number of checkpoints on the digital map.
- Step 3: Using the Assessment feature of the LOTM Tool, Teacher inserts activities or quizzes at selected checkpoints to engage the students and test the understanding of students for the subject matter.
- Step 4: Teacher provides a brief description about the trail and the objectives of the trail and completes the trail creation. The completed trail is stored on the portal for students to access/download via an URL link into their mobile devices when they go for the trail.
- Step 5: Teacher is able to monitor the progress of the students via Location Based Services (e.g. CELL-ID, GPS and WLAN) and the Digital Map on the LOTM Tool.
- Step 6: Teacher can aggregate the responses and the reporting of the students’ performance via the Reporting & Tracking feature to provide just in time help to clear the gaps in the students’ understanding at the end of the trail or back in classroom.



5.1.2 User Scenario for Student

- Step 1: Student A and B arrive at Fort Canning Park with mobile devices which are compatible for the trail. Instructions are given to Student A and B to access a specific URL via GPRS or WLAN to download the trail for Fort Canning Park into their mobile devices.
- Step 2: Upon activation of the trail, a digital map of the current location of the students is displayed. Student A and B are given different clues to start their trail at different checkpoints.
- Step 3: Within range of 20m from the first checkpoint, the trail application alerts that they are within range of the checkpoint.
- Step 4: At each checkpoint, students perform the required tasks (e.g. video the surrounding of the checkpoint or snap a picture of a certain type of spice) then upload the picture, video or audio back to the portal. After verification, the students are issued with the next clue to proceed. Students can also take additional pictures and videos, Geo-Tagged them and upload them to the portal for use later in the preparation of their learning presentation.
- Step 5: At certain checkpoints, quizzes may be posted to the students to test their understanding of a certain subject matter. The responses submitted to the portal are tracked and analysed and the details can be retrieved by the teacher to inform about the students' understanding so that help can be provided to students to bridge their learning gaps.
- Step 6: Student A and B collaborate by using the Communication Tool feature within the LOTM Tool such as instant messaging to share learning points or to ask for assistance.
- Step 7: After the trail, students can download the information captured and gathered from the portal to create a presentation of their group's trail in the form of blogs or wikis and share it with other groups of students.
- Step 8: Using the LOTM Tool, students can also enhance the original trail that was created by their Teacher by appending mashups of content that they have created during their trail onto it. These mashups can then be shared with other students and teachers.