

Libera-te: Edutainment Project on Liberal Studies

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Abstract: This article discusses the design methodology and the 4 *Is* of the edutainment application development, namely instructional design, interface design, information design, and interaction design of *Libera-te*, which is an edutainment application designed for the education of Liberal Studies based on interactive detective game perspective. The outcome of this project is evaluated by semantic differential approach.

Keywords: edutainment applications, creativity, education psychology, design methodology, liberal studies

Liberal Studies and Libera-te

Independent thinking, social awareness, and adaptability to change, which Liberal Studies seeks to cultivate in students, provide a useful foundation for students' further studies, future employment, and lifelong fulfilment. There are three main aims (ABC) for Liberal Studies (LS) education (Education Commission, 2003): a) Awareness: enhancing students' awareness of contemporary issues; b) Broadening: broadening the knowledge base and expanding the perspectives of students; c) Critical thinking skills: strengthening students' critical thinking skills. Creative Problem Solving (CPS) model (Parnes, 1992) suggests that creative process involves five major steps: fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. *Libera-te* is an edutainment application designed for Liberal Studies education. Based on CPS model, *Libera-te* aims at enhancing and broadening learners' awareness and understanding of the diversity of our contemporary world through an interactive detective game setting where users will go through a series of inquisitive discovery of clues, analytic, lateral, divergent, and critical thinking processes.

Methodology

The flow of methodology is as shown in Fig. 1. Synectics (Gordon, 1961) is a problem solving approach consisting of problem-stating and problem solution, based on creative thinking. In our setting, the thinking process involves free use of metaphor and analogy in informal interchange within a carefully selected group of individuals of diverse personality and areas of specialization. To approach this project, a number of synectics sessions were undertaken in the hope to identify quality factors of an edutainment application for education of liberal studies. Survey and statistical analysis were undertaken in order to understand the viewpoint of prospective users (12+ primary and secondary school students) and teachers for

design specification definition. A prototype of Libera-te was then developed. After the development phase, usability testing was undertaken.

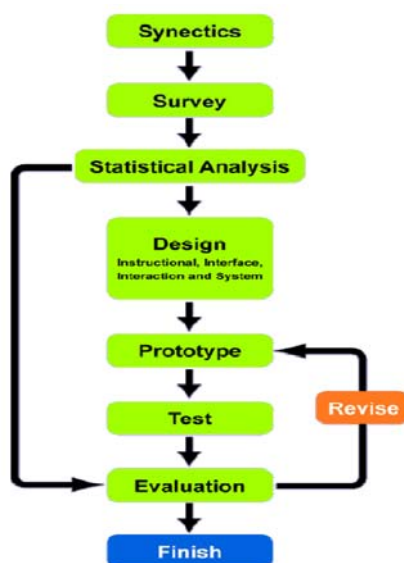


Figure 1 (left): *Methodology*

Design of an Edutainment Application

The design of Libera-te based on the “4Is” of the edutainment application development, namely instructional design, interface design, information design, and interaction design with reference to the learning principles by Gee (2001).

A. Instructional design

For the instructional design, we considered that LS is an interdisciplinary field of study. The aim is to equip students with broad knowledge base, multiple perspective thinking, and lifelong learning skills. The emphasis is on the acquisition of certain *thinking* and *study* skills, and not factual knowledge. General problems faced by LS teachers include a) difficulty in assessment, b) lack of clear guideline in syllabus, c) lack of consensus, d) teaching is not textbook oriented, and e) social awareness is required. Learning has three dimensions (Illeris, 2004): a) the cognitive, content dimension; b) the psychodynamic emotional and motivational dimension; and c) the social and societal dimension of interaction. Fifteen factors were collected in the synectics sessions. Among such factors, five (analytical, associative, comparative, creative, and inspirational) were categorized under the cognitive content dimension; five (challenging, entertaining, explorative, motivational, and relaxed) were categorized under the psychodynamic emotional and motivational dimension; five (cooperative, liberal, institutionalized, multi-dimensional, and situated) categorized under the social and societal dimension. Based on typology of learners (Honey & Mumford, 1982), we investigated the preference of learning activities, namely a) reflective observation, b) abstract conceptualization, c) active experimentation, and d) concrete experience. Survey respondents

generally prefer to begin with studying LS from *active experimentation* and *concrete experience*. With regards to these issues, we considered an interactive detective game (Fig. 2) based on an acquisition learning approach (Roger, A., 2002) to deepen the level of understanding.

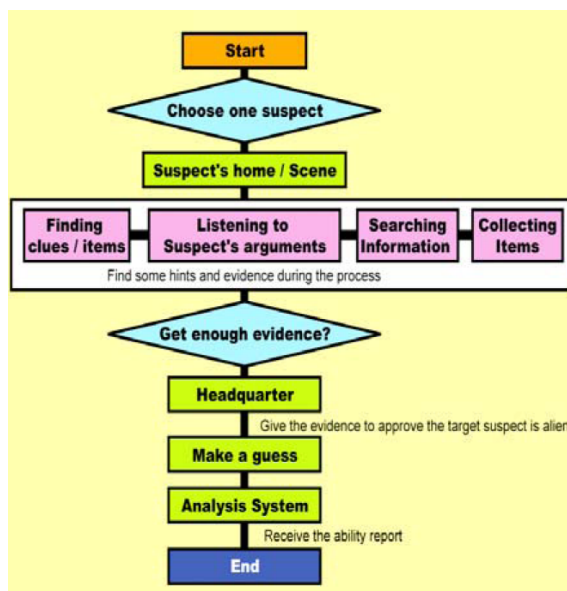


Figure 2 (right): *Game Flow*

At the beginning stage of the game, the student first chooses to enter one of the five scenes of the suspects (multiple routes principle, Fig. 3). The student can then select to obtain evidence by means of either a) finding clues and items, b) listening to suspect’s arguments, c) searching for hidden information, and d) collect evidence and items. Through these processes of inquisitive discovery and exploration (active and critical learning principles), students acquire unanticipated and interesting knowledge and viewpoint, e.g., *Why sausage is red?*, *Hidden secret of calendars*, *All about calories*, using the interface depicted in Fig. 4. Once the student has obtained sufficient evidence, he/she can then go to the headquarter to guess the suspect’s identity. He/she will then receive an ability report on his/her skills in lateral, convergent, and divergent thinking.



Figure 3: *Multiple route, and active and critical learning*



Figure 4: *Knowledge discovery*

B. Interface design

In subsection, we present the interface of the five main scenes of the five suspects, namely ‘Dr Know-it-all’ (Fig. 5), ‘Gifted Kid’ (Fig. 6), ‘Inspector Ken’ (Fig. 7), ‘Miss Keep Fit’ (Fig. 8) and ‘Muscle Man’ (Fig. 9).



Figure 5: *Dr Know-it-all*



Figure 6 (left): *Gifted Kid*



Figure 7 (right): *Inspector Ken*



Figure 8 (left): *Miss Keep Fit*



Figure 9 (right): *Muscle Man*

Meaning of signs is situated in embodied experience (situated meaning principle), and knowledge is distributed across the objects, tools, symbols, and the environment (distributed principle). For discussion about the case and to collect more evidence, two scenes are provided: canteen (Fig. 10) and supermarket (Fig. 11).



Figure 10 (left): *Canteen*



Figure 11 (right): *Supermarket*

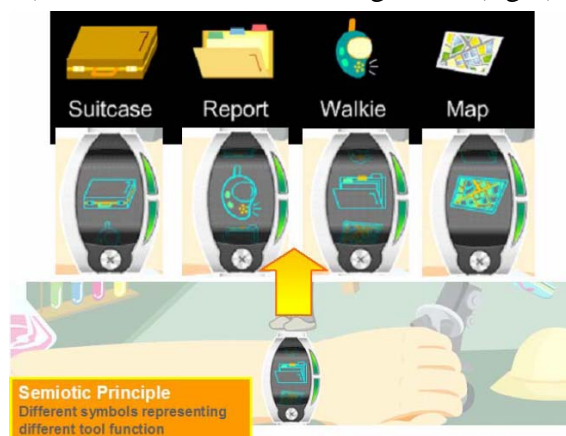


Figure 12: *Tools selection*

Knowledge is built through various modalities, including images, texts, symbols, interaction, and sound (multimodal principle). Different symbols represent different functions (semiotic principle, Fig. 12), which include *suspects report* (Figure 13), *scene map* (Fig. 14), *instruction* (Fig. 15), and *tool box* (Fig. 16); these functions can be accessed via the wristwatch.



Figure 13 (left): *Suspect report*



Figure 14 (right): *Scene map*



Figure 15 (left): *Instruction*



Figure 16 (right): *Tool box*

C. Interface design

Based on the three dimension of learning (Fig. 17), we worked on the learning activities of three *Is* of interaction design: a) to *immerse*: students can roleplay, b). to *inspire* (Fig 18, Fig 19): student can discover, analyze, compare, relate and justify evidence, c) to *interconnect*: students can discuss with each others. Such an active-learning approach allows students to experience, to probe, to hypothesize, reprobe, and rethink.

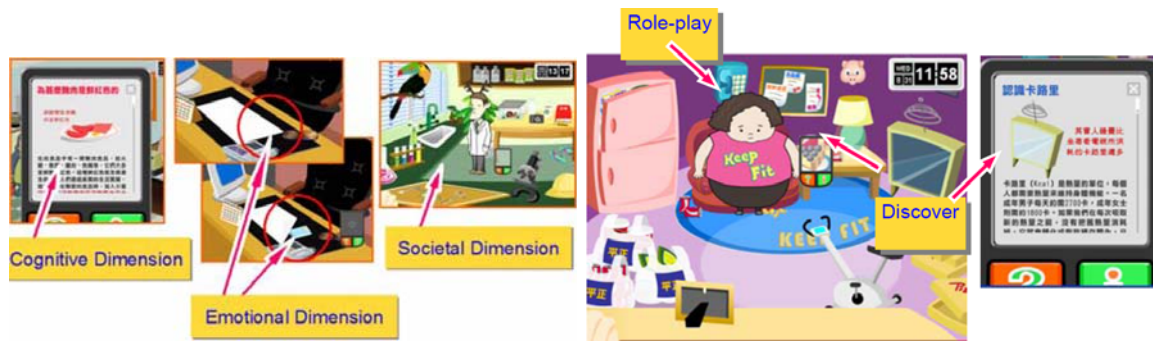


Figure 17 (left): *Three dimension of learning*

Figure 18 (right): *Role-play, and discover*



Figure 19: *Relate, compare, and justify*

D. Information design

For the information design, symbolic and semiotic representations through graphics were given preference over text. Knowledge is stored in material object and the environment (material intelligence principle, Fig. 20). During the phase of discovering evidence, relevant information is only given at times when the information can be best understood, which strongly depends on the sequence of actions performed by the student (explicit knowledge on demand and just in time principle, Fig. 21).



Figure 20 (left): *Material intelligence*

Figure 21 (right): *Explicit knowledge on-demand and just-in-time*

Conclusion

Different to traditional classroom teaching approach, we believe that students will pay more attentions in class, and be motivated to LS topics if Libera-te is involved in the teaching process. Parents can also participate and enjoy learning with their children and be able to keep better track of their children's learning progress. Since up-to-date learning content will be provided, teachers' workload could be reduced. Moreover, since Libera-te is available to download on the Internet, students can continue their learning activities after class. To show that Libera-te fulfils its intended goals, we present the usability testing result and our future development plan based on 4 Es of edutainment application, namely efficiency, efficacy, educational, and entertainment values.

A. Usability testing

Psychometric analysis based on the semantic differential method was undertaken. A total of eighteen students from primary and secondary schools in Hong Kong participated (Fig. 22). The result (Fig. 23) shows that while Libera-te received positive feedback for most of the qualities, respondents generally agreed that Libera-te is highly explorative. This shows that Libera-te successfully engages learners by the clue-searching features of the interactive detective game approach. Result also shows that Libera-te needs improvement in qualities such as cooperative, situated, comparative, and entertaining.



Figure 22: *Usability Testing*

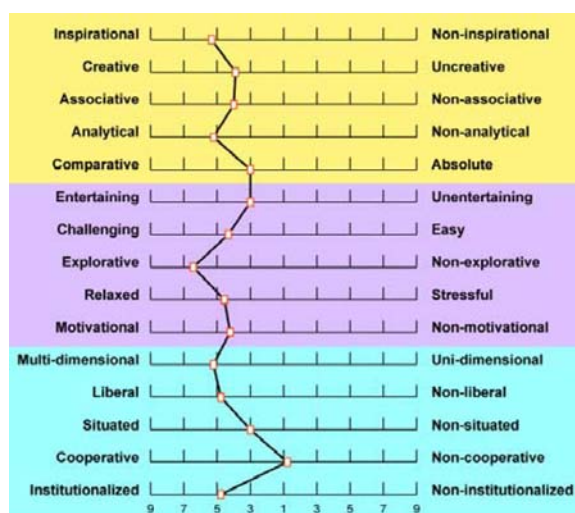


Figure 23: *Semantic Differential Result*

B. Future development plan

Further work can be extended to further developments based on the 4 Es: a) efficiency: complementary multi-lingual classroom teaching material to link up traditional and virtual environment to encourage students to engage cognitively, physically, and socially; b) efficacy: multi-user environment with chats and video-conferencing features for asynchronous and synchronous communication which allows students to solve problem collaboratively; c) educational value: a mechanism to allow interested parties (students, teachers, experts, and parents) to contribute content and share tacit knowledge in affinity group; d) entertainment value: award and compliment mechanism by artificial agents.

Acknowledgement

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