Enhancing Learning Emerging Technology with On-line e-Portfolio for the High-Scope Project

Lung-Hsing Kuo, Hsieh-Hua Yang, Wen-Chen Hu, Hung-Jen Yang

***Abstract*—**The purpose of this study was to identify the process of developing an e-portfolio and examined its validity and coordinators' perceptions to assess learning performance in the High-Scope on-line game. Research has indicated the importance of evaluating the experiences related to developing e-portfolio, electronic portfolio, to contribute to the overall excellence in teaching and learning. A e-portfolio platform was developed according to the on-line game for the High-Scope project which is a NSC research project had been conducted by the research group for promoting high school students learning emerging technology since 2010. This study reports the process of developing an e-portfolio system for contest and e-portfolio assignment designed for contest activity. By investigated the e-portfolio system and follow up data collecting, the e-portfolio system was validated according to the e-portfolio requirements and learning goals. Total six groups of 45 students were within the whole contest procedures, the grouping stage, the learning stage, the problem solving stage, the presentation stage, and the reflection stage. Analyses of quantitative and qualitative data were presented. A major result indicated that the use of e-portfolio is considered as a pragmatic vehicle to assess learners' performance and the reflection function of e-portfolio for the learners is good for preparing them become a well evidence-thinker.

***Keywords*— e-Portfolios, High-Scope Project, On-line Game, Emerging Technology**

I. Introduction

In this Information Age, learners have at their disposal enormous amounts of data collected in transactional systems. These systems are designed for the well-organized selection, storage, and retrieval of data, and are vital for learners to keep track of their knowledge formations.[1-7] Collecting data through computers' assistance become a regular situation. How to evaluate learners' performance and also provide learners' growing opportunities becomes a major problem of educators facing computer supporting learning.

Manuscript received Nov. 1, 2013: Revised version received Jan. 18, 2014. This work was supported in part by the Taiwan National Science Council under High Scope Project Grant 102-3113-S-017-002-GJ & 102-3113-S-017-003-GJ .

L.H. Kuo is with the National Kaohsiung Normal University, 80201 Taiwan, R.O.C. (e-mail:admi@nknucc.nknu.edu.tw)

H.H.Yang is with the Oriental Institute of Technology, 220 Taiwan, R.O.C. (e-mail:yansnow@gmail.com)

W.C. Hu is with the University of North Dakota, ND 58202-9015, USA. (e-mail:wenchen@cs.und.edu)

H.J. Yang is with the National Kaohsiung Normal University, 80201 Taiwan, R.O.C. (e-mail: hjyang@nknucc.nknu.edu.tw, phone: 886-7-7172930 ext. 7603,; fax: 886-7-6051206).

The standard-based, performance-based assessment and curricula have increasingly been emphasized on schools in many parts of the world. The Republic of China have national standards of technology as well as for various teaching subjects that provided accountability measures that impacted teaching and learning. Education programs ought to be responsive to the direction of performance education. Urgently, in the developing on line competition, such as High-Scope, there is even greater need to introduce and implement this direction to provide quality education to emerging technology learning. It has been reported that e-portfolios, electronic portfolio, as performance assessment, differ from the traditional assessment in that they are broader in scope and more authentic [8-15]. In using new technologies, such as the portfolio, the assumption seems to be that we can substitute one medium for another—keeping the benefits of traditional print formats while adding a host of new conveniences. In previous cited research studies, they were found that learning have been impacted by use of e-portfolios.

II. E-Portfolio

Aggregating data into levels at which patterns can come into view, ordering levels into hierarchies to support drilling down and up through the levels, and using investigative functions such as lag, moving total, and year-to-date are among the techniques used to transform data into information. This information can provide a major boundary in a competitive marketplace.[16]

The last ten years have seen an enormous growth of interest in e-portfolios and the benefits they can bring to learners. In this session, what e-portfolios are would be examined, the range of ways they can be used, the benefits they can bring and ways to realize these benefits, now and in the future.

The definition for a portfolio could be: 'a container ... for loose papers, drawings, etc.: a collection of such papers.' This does not conjure up exciting connotations: it evokes images of old boxes of yellowing papers in a dusty attic. However, two things contradict this image and make e-portfolios one of the most exciting areas of development in education and training at the moment.

- The "e" side. The essence of networked computers is their potential to transform static, "dead" information into dynamic, flexible, growing information, which can be shared, developed, re-contextualized, searched and

viewed from different perspectives.

- The move to lifelong learning, which places the learner - their work, achievements, reflections and goals - at the centre of the learning process. In the stereotypical "old days", when learning consisted of long, fixed blocks, the place of portfolios was limited. However, in the new knowledge economy, it is important for learners to take ownership of their learning, and to continually reflect on where they are, the learning and achievements which have brought them there, where they want to go, and the learning they need to get there. e-Portfolios provide a vehicle to enable this.
- An e-portfolio is an electronic format for learners to record their work, their achievements and their goals, to reflect on their learning, and to share and be supported in this. It enables learners to represent the information in different formats and to take the information with them as they move between institutions.

A. Functions of e-Portfolios

It represents a coming together of several concepts which have a particular resonance at the moment - for example:

- Reflective journals;
- Weblogs or "Blogs" - and the shared version – Wikis;
- Learning logs;
- Personal development planning;
- Learning centered on the individual learner; and
- Action planning for learning.

Table 1 Types of e-portfolio information

Type	Examples
Coursework	Ranging from brief notes to extensive assignments. May be in any medium, for example, text, images, sound, and video. May be school homework examples, college assignments, for example.
Assessment work	May include diagnostic, formative and summative assessments.
Other pieces of work or artifacts	For example, presentations, job or course applications, CVs.
Achievement of individual learning outcomes	May be formally or informally recorded
Aggregated records of achievement, accreditation and credit towards awards	Qualifications, awards (and credits towards awards), certificates, completion of courses.
Evidence for assessment	Journal entries, learning agreements, personal development plans, individual learning plans
Planning and reflection	Journal entries, learning agreements, personal development plans, individual learning plans
Notes and annotations on other entries.	Formal or informal: made by the learner, or by teachers, mentors. Including verification of entries.
Skills and competencies	Taken from to a particular framework, for example, for a job, or informally recorded.
Outcomes of appraisals, interviews, etc.	With tutor, employer, for example. Self-assessments and appraisals. Peer-assessments and appraisals
Links between entries	Pieces of work contributing to an award: planning to achieve particular skills, etc.
Entries shared with peers	e-Portfolios can support peer group learning, with shared assignments, and commentary on each other's work and ideas.

By focusing on learners' achievements and work and providing access to related information in a networked or web environment, major benefits may be realized from e-portfolios. These benefits may include:

- Supporting coherent management of a variety of achievements and pieces of work. These can be restructured and viewed in different ways for different purposes, for example, for reviewing learning, planning future learning, or providing evidence for an award or an employer;
- Helping learners take control of their learning and their lives, by reflecting on their activities and planning future directions;
- Providing a learner-centered rather than course-centered view of learning;
- Giving appropriate views of achievement and learners'

work to appropriate people, for example, the learner, teachers, mentors, careers advisers, potential employers, educational institutions to whom the learner is applying;

- Supporting "just in time" or "bite sized" learning, by contextualizing which bite of learning is needed at this moment in time and helping place it in the context of a long-term learning journey;
- Facilitating a wider variety and more authentic forms of assessment and accreditation;
- Complementing credit-based approaches to flexible accreditation;
- Providing continuity through a learner's lifelong learning as they move between learning providers;
- Helping with continuing professional development, by encouraging reflection on practice and linking this with learning activities; and
- Linking learner's achievement and work with the skills required by their employers, helping to identify learning needs and "close the skills gap".

The idea of portfolios is far from new. They have been used for recording evidence and work for many years. However, the "e" in e-portfolios does add significantly to their utility, adding flexibility, ease of sharing, reuse of entries in different presentations for different contexts, portability and different views for different contexts.

As there is enormous variety between learners in terms of their style and need, e-portfolios must be versatile to cater for the wide range of requirements and contexts. Three main dimensions of variation in e-portfolios are described according to types of information held. Table 1 provides a list of the potential types of information that might be stored in an e-portfolio.

B. Stages of Learning

Table 2 below outlines the different stages of learning and how that might impact on the uses of e-Portfolios.

Table 2 Stages of e-Portfolios

Stage	Relates to	Notes
School - up to 14	Progress files	The organization of learners' work and progress, and access to it, is one of the central benefits that ICT can provide in schools.
14 -19	Progress files	Could be an essential enabler for Tomlinson's "diploma" vision of learners on individual programs, across school, college, work placement, days at University etc. Relevant to both formal transcripts of achievement, and to more formative records of ongoing work.
College	Progress files: Widening Horizons	Multiple views of learners' work becomes increasingly important in further education - for example for evidence based assessment or accreditation of prior learning.
University	PDP, learner transcript.	It will be mandatory for universities to support personal development planning by 2005, and most universities are planning to provide online support for this.
Continuing Professional Development	Various formats of e-portfolio	Portfolios of work - possibly work which the learner is doing anyway (e.g. lesson plans, case notes) - with reflections on practice, and feedback from tutors and peer group - are often central to CPD.
Lifelong learning	Various formats of e-portfolio	As learners move from one learning episode to another, often with different providers, being able to take their work and achievements with them is important.

C. Accreditation and Assessment

An important part of the move to flexible lifelong learning is an environment for responsive, integrated assessment and accreditation of achievement. E-Portfolios have a great deal to offer in supporting this.

Portfolio-based assessment for awards has a long and successful history. E-Portfolios enhance the convenience, availability and relevance of this form of assessment. In moving forward, we see the following as important:

- Credit frameworks for contests.
- More authentic assessment.
- Fewer boundaries between work, learning and accreditation.
- Work-based assessment.

- A wider and more flexible range of approaches to assessment.

*D.*Technology Education & High-Scope Game

Technology education is a subject area of common education and provides learner the opportunity of understanding technology. New technology grows everyday and the information and knowledge of technology expands, too. Systems of technology in some areas are even exploded, such as energy & power technology and information & communication technology. In science education, how to integrating emerging technology into formal education becomes a concern. Education reform acts in Taiwan pointed out this trend and raised a "High Scope Curriculum Development" project to foster teachers to design teaching material and learning activities of emerging technology.[3, 4]

The key questions concerning any proposed new technology should include the following:

1. What are alternative ways to accomplish the same ends? What trade-offs would be necessary between positive and negative side effects of each?
2. What will the proposed new technology cost to build and operate? How does that compare to the cost of alternatives? What will the social costs be?
3. What risks are associated with the proposed technology? What risks will the technology present to other species of life and to the environment?
4. What people, materials, tools, and knowledge will be needed to build, install, and operate the proposed new technology?
5. What will be done to dispose safely of the new technology's waste materials?

The Technological Method Model provides a fran1ework for teaching technology. That is, it provides the framework for the immersion of students in actual technological practice. & such, in its educational counterpart, the Model for Technology Education (Fig l), students will identify problems or opportunities utilizing the problem solving method, selecting the appropriate resources and employing technological processes to produce outcomes for which they will assess the consequences.

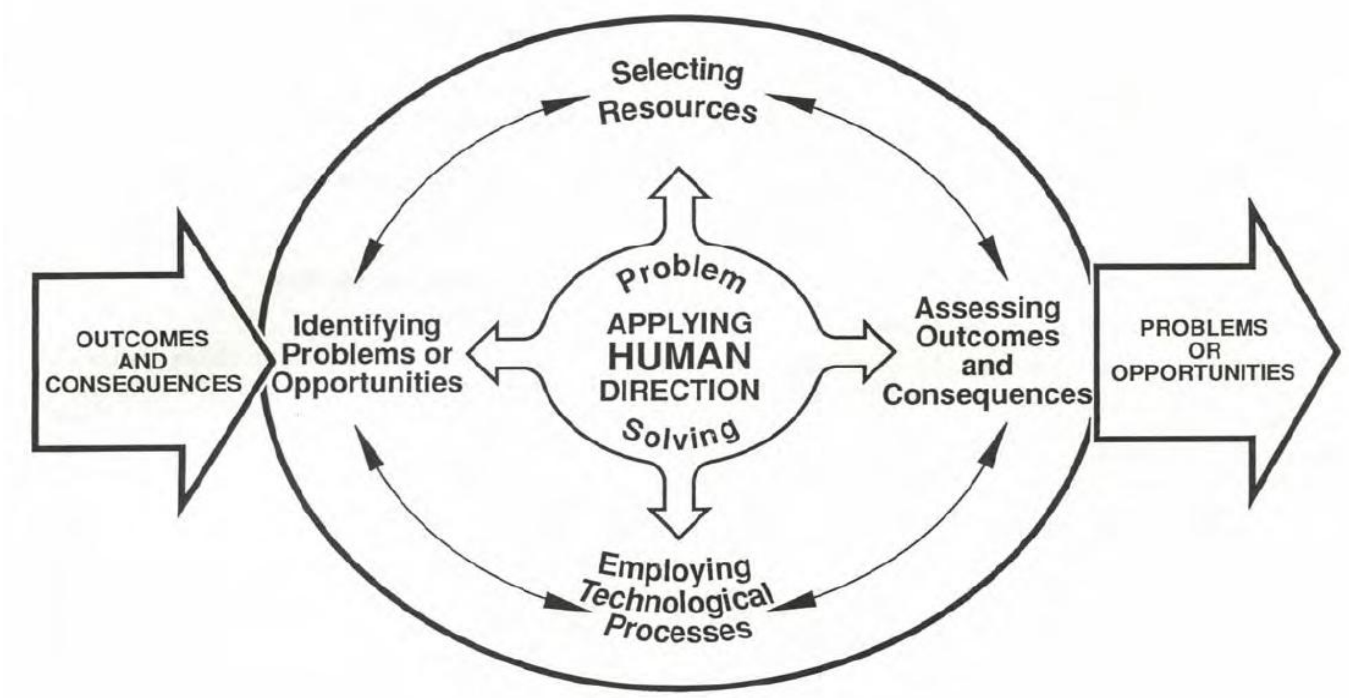

Fig. 1 A model for Technology Education

Credit frameworks enable learners to build up credit towards an award gradually in units. This enables more flexibility in the accreditation process, since learners can transfer credit between awards and institutions. They do not have to commit at the

beginning of their learning to the award they will be aiming for. This can adapt as their learning, work and life circumstances develop. E-Portfolios can be ideal for supporting credit-based awards because:

- They can record the whole range of information about achievement of units making up an awards: evidence, assessor comments, reflections and plans relating to progression towards the awards, as well as achievement of learning outcomes and units of credit.
- They support managed and authenticated access to appropriate parts of the e-portfolio for assessor and tutor roles as well as for learners.
- With appropriate standards specifications and working practices (see below), they support the transfer of credit and related information between institutions.

There is more authentic assessment. For example, assessment related to the "normal" application of the skills and knowledge being assessed, rather than artificial assessments, such as exams whose setting is very different from normal application. There are fewer boundaries between work, learning and accreditation. The flexibility of e-portfolios helps learners think about their experience and work as relevant evidence for credit and awards. It is a work-based assessment. In the technology education, learning product is based around portfolios of evidence, which also supports the detailed workflow of assessors going out into the workplace and following the real-world assessment processes. It could be a wider and more flexible range of approaches to assessment. For example, e-assessment, teacher assessment, traditional examinations, and project and presentation based assessment are all with a flexible balance of assessment approaches. This balance provides a challenge, and that more work is needed on assessment arrangements. The flexibility and appropriate accessibility of e-portfolios can provide a useful tool in meeting this challenge, although care is needed to ensure the validity of portfolio contents for high-stakes assessment.

Technological literacy is much more than just knowledge about computers and their application. It involves a vision where each citizen has a degree of knowledge about the nature, behavior, power, and consequences of technology from a broad perspective. Inherently, it involves educational programs where learners become engaged in critical thinking as they design and develop products, systems, and environments to solve practical problems. Through technology, people have changed the world. In the drive to satisfy needs and wants, people have developed and improved ways to communicate, travel, build structures, make products, cure disease, and provide food. This has created a world of technological products and machines, roadways and buildings, and data and global communications. It has created a complex world of constant change.

In effect, to teach technology, students must "do" technology which translates into involving students in each element in the Model for Technology Education and in the interactive nature of the Model.

- Applying Human Direction
- Identifying Problems or Opportunities
- Selecting Resources
- Employing Technological Processes
- Assessing Outcomes and Consequences
- Practical Implications for the Study of Technology

Evaluation is a mean for understanding how things going. Based on the evaluation goal, criteria should be identified before evaluation could be conducted. There is a need to create a system to pin point effects of integrating emerging technology into formal technology education, so can reveal the integral information and characteristics of curriculum innovation. The purpose of this study was to identify the process of developing an e-portfolio and examined its validity and coordinators' perceptions to assess learning performance in the High-Scope on-line game.

A "game" is exercise that has a winner. The winner of the game is the individual or team that first successfully completes the requirements of the game. The game essentially provides a competitive setting for learning specific subject matter.

In contrast, games are competitive interactions among participants to achieve pre-specified goals. These interactions may feature cooperation within groups.

Games are usually played for entertainment and clearly identify winners and losers. Participants' success is dependent upon skill or chance or some combination of the two. Games make no attempt to replicate real-world behavior and rules of behavior for the game need apply to the game only.

From these two ideas, simulation to represent elements of reality and gaming to stimulate interaction and simulation games have developed as powerful learning constructs. Creating a "winner" inside the context of a simulation provides a driving force for the participants to understand the environment and be successful. Though there are fundamental differences in the three types of exercises, for the purposes of this paper, the terms "game", "simulation" and "simulation game" will be used interchangeably, unless there is a particular reason to highlight the differences.

Every game must have a purpose and game must have a structure. These purposes and structures combine to form different types of games.

Although the following examples may not represent mutually exclusive categories, they do serve to differentiate among the variety of simulations and games. For example, non-simulation games are competitive learning exercises in which a participant's success is determined by the degree that the desired goal is achieved during the game play.

Inter-personal games are learning exercises in which the participant responds, as if he/she were in the actual system being simulated. Interaction is structured by rules and physical circumstances. Large system games are exercises for the examination of the dynamics of complex systems of interaction. The focus may range from examining the variables affecting a business community to an analysis of the nation-state system of the international community/market. The participant is engaged

in the simulated system as a planner, a decision-maker, or an observer in order to better comprehend the variables affecting the dynamics of human and business behavior within the context of the system being modeled.

A game is a complex structure that can be viewed from many different directions. The success or failure of a simulation or game will depend on how well it is designed and whether or not its complexity is appropriate or overpowering. One benefit of complexity is that there may be opportunities to modify the exercise to achieve other purposes. A robust structure can result in a family of games, each with a specific educational purpose.

III. Methodology

The purpose of this study was to identify the process of developing an e-portfolio and examined its validity and coordinators' perceptions to assess learning performance in the High-Scope on-line game. This is a empirical study with both qualitative and quantitative verification on the research questions.

The goals of on-line contest were established during the prior study. A game based on-line platform with e-portfolio functions were designed according to the purpose of learning game.

A. Participants and Survey

In this study, the contest was mainly designed for high-school students for learning emerging technology. Participants were 45 high-school students in 6 groups who enrolled in the on-line contest for emerging technology learning.

Each group was required at least one teacher as a coach. All these coaches are qualified high-school teacher and major teaching area in the science & technology.

For review participants final products and formational evaluation functions, three evaluators were invited. All three evaluators had more than ten years experience on applying information and computer technology for education.

A survey was developed by researchers to include aspects related to the on-line activity, e-portfolio development, and experience gained to adequately provide insight into participating learners' perceptions. Twenty four items were included. There are five sub-categories, relevance, reflective thinking, interactivity, tutor support, peer support, and interpretation. Those items were purposefully presented to reflect good practice and theory in a five-point Likert scale.

B. Data Collection & Functions

The data collected in this contest could be identified into three parts. The first part is personal information for introducing self to other members. The second part is on-line learning records. The third part is final team project.

- The first part data was collected by students finishing their basic information sheet and upload their own selected artifact.
- The second part data was collected while student doing their on-line learning activities.
- The third part data was collected while students doing their final group project.

Table 1. Items of the survey instrument

Relevance
my learning focuses on issues that interest me.
what I learn is important for my professional practice.
I learn how to improve my professional practice.
what I learn connects well with my professional practice.
Reflective thinking
I think critically about how I learn.
I think critically about my own ideas.
I think critically about other students' ideas.
I think critically about ideas in the readings.
Interactivity
I explain my ideas to other students.
I ask other students to explain their ideas.
other students ask me to explain my ideas.
other students respond to my ideas.
Tutor support
the tutor stimulates my thinking.
the tutor encourages me to participate.
the tutor models good discourse.
the tutor models critical self-reflection.
Peer support
other students encourage my participation.
other students praise my contribution.
other students value my contribution.
other students empathies with my struggle to learn.
Interpretation
I make good sense of other students' messages.
other students make good sense of my messages.
I make good sense of the tutor's messages.
the tutor makes good sense of my messages.
How long did this survey take you to complete?

Those collected data could be included following types information:

- Text
- Graphic
- Audio
- Video

The system should be able to provide these three major data collecting purposes and be able to provide all functions of deal with types of information. Three evaluators were asked to evaluate functions used by learners and answer the question of "whether the e-portfolio provide enough information for evaluating?"..

This on-line learning activity provides a comprehensive experience that supports students' emerging technology learning. Each group is required to complete three main assignments: (1) personal information; (2) on-line course learning; and (3) e-portfolio. The e-portfolio aims to provide

students with an authentic experience that compile knowledge, skills and dispositions learned in the program.

In this e-portfolio task, students are expected to create an e-portfolio organized around the emerging technology conceptual framework elements of High-Scope project. The portfolio is submitted to instructors as a Website.

Evaluators were asked to verify whether those functions were feasible in evaluate the team performance according to the contest goals.

C. E-Portfolio Platform

In general, the on-line contest was conducted on a platform that could promote a social constructionist pedagogy and assignment modules for recording learning performance as well.

The on-line contest was designed based upon a High-Scope Project offered by the National Science of Council, NSC, in Taiwan, the Republic of China. This is the second stage project which was devoted to the emerging technology curriculum development for high school. The whole curriculum was targeted into integrating emerging technology contents within formal education. The emerging technology would be focused on both communication technology and energy technology. This project was conducted by Ping-Tong Fong-Lao High-school. This on-line game was implemented to promoting the integrated learning contents developed in prior research. The goal of this contest was defined by the research group and listed in the followings.

1. Promoting students with the understanding with emerging technology issues
2. Exploring technology development with local characteristics
3. Learning the core concept of the green energy for supporting high school technology education

Fig. 2. Conceptual model of E-Portfolio Contexts and Game Learning

The registration time was from 2013/06/17 to 2013/06/28. There were three steps in the contest. The first step of the contest is for familiar with both the on-line environment and competitors. The second step of the contest is for learning the contents of emerging technology. The third step is creating their final product. The time periods for each step are two weeks, four weeks, and two weeks.

For the contest, the starting date of each step were listed in the followings

1. 2013/07/01

2. 2013/07/15
3. 2013/08/19

The server was close the upload function for their final products at 2013/08/30, 17:00.

The contest platform were organized both the Moodle server and Mahara server. The moodle's design characteristics are illustrated as followings:

- Promotes a social constructionist pedagogy (collaboration, activities, critical reflection, etc)
- Suitable for 100% online classes as well as supplementing face-to-face learning
- Simple, lightweight, efficient, compatible, low-tech browser interface
- Easy to install on almost any platform that supports PHP. Requires only one database (and can share it).
- Full database abstraction supports all major brands of database (except for initial table definition)
- Course listing shows descriptions for every course on the server, including accessibility to guests.
- Courses can be categorised and searched - one Moodle site can support thousands of courses
- Emphasis on strong security throughout. Forms are all checked, data validated, cookies encrypted etc
- Most text entry areas (resources, forum postings etc) can be edited using an embedded WYSIWYG HTML editor

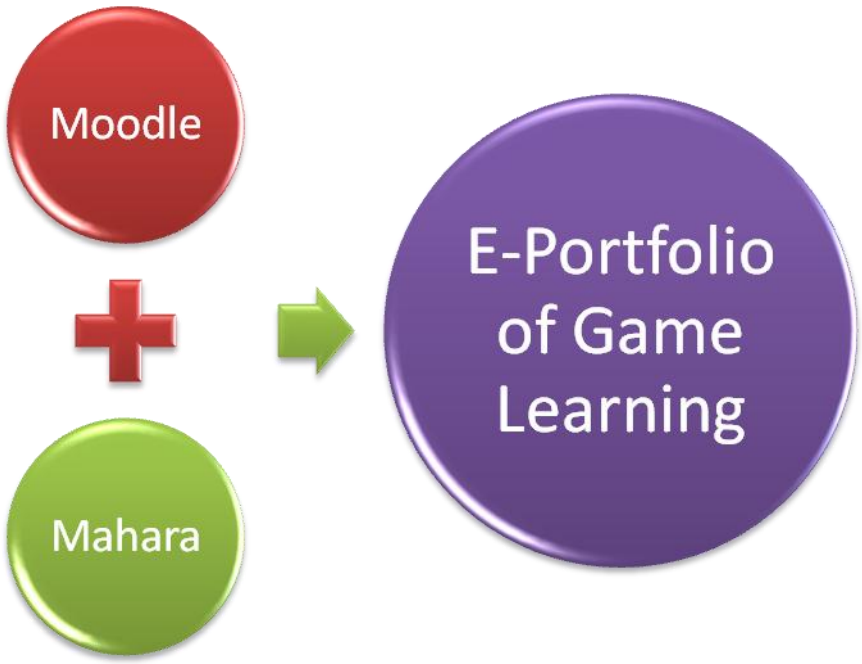

Fig. 4. Conceptual model of inactive-service and active service

The Mahara's design characteristics are listed in the followings. Owners control which items and what information or artifacts within your portfolio other users see. All artifacts owners wish to show to other users need to be bundled up and placed into one area called a View.

- Owners could have as many Views as they like, each with a different collection of artifacts, and intended purpose and audience. The people owners wish to give access to the View, can be added as individuals

or as a member of a Group or Community.

- The system includes a file repository which allows users to:
  - Create folder and sub folders structures
  - Upload multiple files quickly and efficiently
  - Give each file a Name and Description
  - Manage their file allocation Quota
  - Configurable copyright disclaimer
  - Can extract .zip, .tar.gz and .tar.bz2 from within the files area
- A comprehensive blogging tool is provided in Mahara, where blogs and blog postings are considered Artefacts and may be added to a View. The blogging tool allows users to:
  - Create blog posts using a WYSIWYG editor
  - Attach files to posts
  - Embed images into postings
  - Configure whether or not Comments may be received on their blog
  - Create draft postings for later publishing
- Social Networking:
  Mahara provides a social networking facility where users can create and maintain a list of Friends within the system. ePortfolio owners choose whether other users can add them to their Friends list automatically or by request and approval. An ePortfolio owner's Friends lists shows those Views to which they have been assigned access.
- Resume Builder
  Mahara includes a resumé builder which allows users to create digital CV's by entering information into a variety of optional fields including:
  - Contact and personal information
  - Employment and education history
  - Certifications, accreditations and awards
  - Books and publications, professional memberships
  - Personal, academic and work skills and
  - Personal, academic and career goals
- Profile Information: Within Mahara users are able to share details through a variety of optional profile information fields.
- Interface with Moodle: Mahara provides a single-sign on capability that allows users, at the option of the administrator, to be automatically logged in to both their Mahara and Moodle accounts by providing a username and password at only one of these sites. The user can sign on at Mahara, and click on a link to her Moodle account, or sign on at Moodle, and click on a link to her Mahara account. The single-sign-on feature runs over an encrypted transport, and the user's passwords do not have to be shared between sites.
- Scalability:
  - Mahara automatically detects system settings that a pose a security threat.
  - Session key handling code has been tightly integrated with the core form/request APIs.
  - Provides database abstraction that prevents any database injection attacks and input validation that prevents script injection attacks.
  - User authentication can be tied to external systems such as student management systems or other databases such as their Student ID number.
- Interoperability:
  - Mahara includes an Import/Export system with Leap2A support, and static HTML export.
  - Users can place their views under any of the Creative Commons licenses.
  - Mahara is built using PHP web scripting language and leverages PHP5's OO features.
  - All plug-ins follow a consistent structure and inherit from a common base class (core functions of plug-ins are implemented once)
  - Mahara currently supports plug-ins for Artifacts, Authentication and Search. Therefore interoperating with an existing product simply requires the development of a plug-in.

The integration between Moodle and Mahara has been affectionately named "Mahoodle". It allows true single-signon between both systems - no password sharing required, and users' profile information is ported across. In addition, users are able to submit Mahara Views to Moodle for assessment with a plugin for Moodle.

D. On-Line Contest Design

The development of a game is a multi-step process and it must be designed to meet the requirements of the task. Before attempting to establish a on-line contest, there are several preliminary steps that must be completed.

First, the Goal of the Exercise was defined. The purpose of the exercise must be unambiguous. The goal may be to demonstrate or learn a fact, a skill, a behavior or some combination of the three. A key aspect of a successful game is that it addresses a limited set of actions. Attempting to do too much within a single exercise will make a game unworkable. Be aware that as the exercise develops, the questions might change. This indicates that the initial questions were incorrect or too limited. It may also indicate that there are multiple facets to the exercise that should be addressed separately.

Second, the available resources were identified. An exercise

can be designed that requires a complex computer set-up or a simple piece of paper. Players may be required to sit in one place or move around a room. The physical resources may depend on the exercise or they might help define the exercise. As a general rule, it is better to work with a simple infrastructure. The fewer the physical requirements, the more portable the game is. It might be desirable to place artificial constraints on the environment, for example, having players sit very close together or very far apart or forbidding speech. Such artificial barriers can serve to demonstrate the goal of the exercise by channeling activities more directly towards it.

Third, the rewards, and stress were designed. The presence of a reward determines whether the exercise is a simulation or a game. The lack of a reward can lead to more cooperative behavior between participants. The presence of a reward can lead to competition, especially if the reward is significant. It is often enough to offer the winners some bonus points on the next examination.

The design of the game would have to include a predetermined probability distribution of the possible outcomes in order for the participants to have information available for their decision-making. The advantage of randomness is that it more accurately models the real world. The level of stress that will be induced in the players must be determined prior to the design of the game. Some stress is necessary for learning to occur.

E. Survey Results

There are five sub-categories, relevance, reflective thinking, interactivity, tutor support, peer support, and interpretation. Those items were purposefully presented to reflect good practice and theory in a five-point Likert scale. The values are from one to five and represent almost never, seldom, sometime, often, and almost always.

In the Fig. 4, all four items are above sometimes and below often. The result is shown the positive relevance statuses are confirmed by the learners.

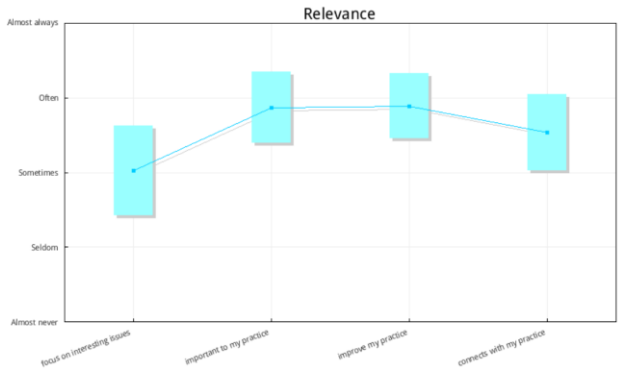

Fig. 5 Survey Results of Relevance Items

In the Fig. 5, three out of four items are above often. Only one item is between often and sometimes. The result is shown the positive reflection thinking status is confirmed by the learners.

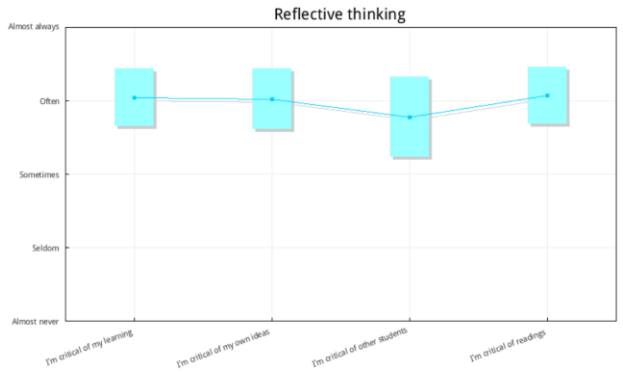

Fig. 6 Survey Results of Reflection Thinking Items

In the Fig. 6, all four items are above sometimes and below often. The result is shown the positive interactivity statuses are confirmed by the learners.

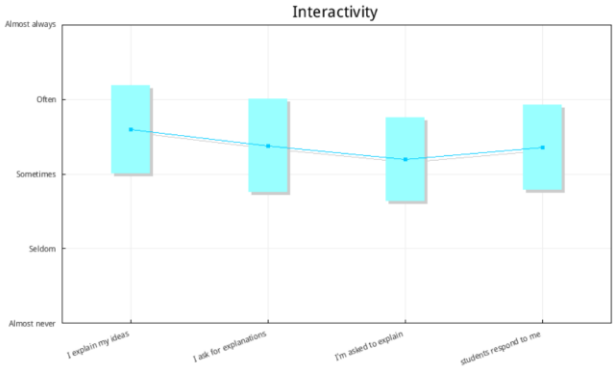

Fig. 7 Survey results of Interactivity Items

In the Fig. 7, three out of four items are above often. Only one item is between often and sometimes. The result is shown the positive tutor support status is confirmed by the learners.

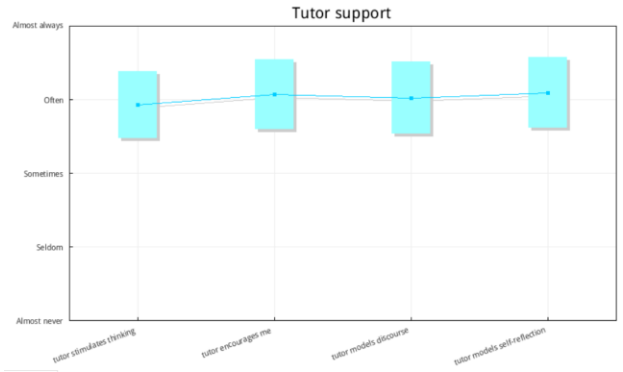

Fig. 8 Survey Results of Tutor Support Items

In the Fig. 8, all four items are above sometimes and below often. The result is shown the positive peer support statuses are confirmed by the learners.

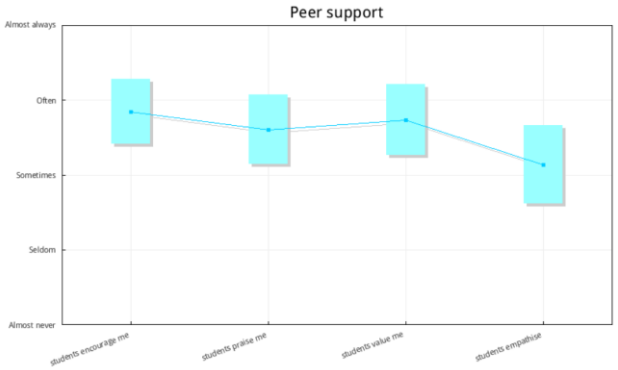

Fig. 9 Survey Results of Peer Support Items

In the Fig. 9, all four items are above sometimes and below often. The result is shown the positive interpretation statuses are confirmed by the learners.

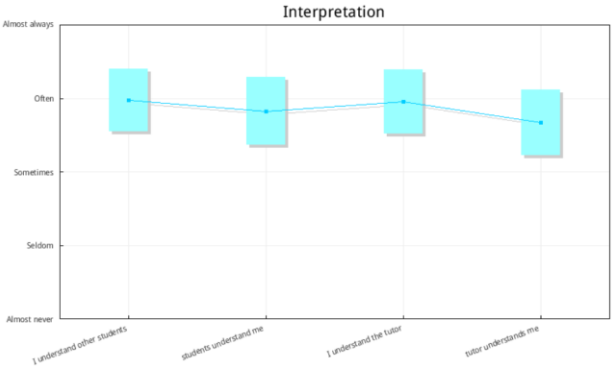

Fig. 10 Survey Results of Interpretation Items

For understanding the survey responses under sub-categories, the results were calculated by reference group, reflect thinking group, tutor group, peer support group, and interpretation group. In table 2, the mean of reference category is 3.58. The mean of reflect thinking category is 4.00. The mean of tutor support is 4.03. The mean of peer support category is 3.58. The mean of interpretation category is 3.86. All five values are higher than three, sometimes. On the other hand, they are close to four, often. Learners' response is positive in each category.

For further identify whether there exists significant difference between the learners' response and the value of scale sometimes, three, one-sample t-test procedure was conducted.

Table 3. One-Sample Statistics of Survey Response in Sub-categories

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Reference	45	3.58	.77	.12
Reflect Thinking	45	4.00	.69	.10
Tutor Support	45	4.03	.88	.13
Peer Support	45	3.58	.81	.12
Interpretation	45	3.86	.73	.11

Table 4. One-Sample t-test of reference, reflect thinking, tutor support, peer support, and Interpretation.

One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Reference	5.008	44	.000	.57778	.3453	.8103
Reflect Thinking	9.443	44	.000	.97778	.7691	1.1865
Tutor Support	7.797	44	.000	1.02778	.7621	1.2934
Peer Support	4.766	44	.000	.57778	.3334	.8221
Interpretation	7.843	44	.000	.85556	.6357	1.0754

In Table 3, the significant values of each category are less than 0.05. It was concluded that there exists significant difference between learners' response and the scale value 3 in all five categories. The positive tendency in reference, reflect thinking, tutor support, peer support and interpretation of on-line gaming/e-portfolio activity was confirmed statistically.

IV. CONCLUSION

The literature review showed a great need for addressing whether the experience of creating an e-portfolio contributes to the development of reflection and learner. From a constructivist point of view, people actively construct new knowledge as they interact with their environments.

Everything people see, hear, read, feel, and touch is tested against his/her prior knowledge and if it is viable within your mental world, may form new knowledge he/she carry with. Knowledge is strengthened if one can use it successfully in one's wider environment. People are not just a memory bank passively absorbing information, nor can knowledge be "transmitted" to people just by reading something or listening to someone.

This is not to say people can't learn anything from reading a

web page or watching a lecture, obviously people can, it's just pointing out that there is more interpretation going on than a transfer of information from one brain to another.

The creating, evidencing, connecting and reflecting are all involved in e-portfolios and engaged by students in a new and beneficial way—especially when the portfolio provides a space for student informed participation. This is particularly important in educational innovation, such as the High-Scope Project which education has shown major developments and has yet need to show similar advancement in use of technology in education. Assessment is particularly an area that seen to have made major contribution.

Participants of this study developed understanding of learned materials and technology use through creating e-portfolios and providing reflective narratives. They were able to show a progress in their learning and readiness to cope with emerging technology. Other students acknowledged the fact that, as a result of developing the e-portfolio, they learned new ways to showcase work became reflective learners and had a deeper understanding for knowledge and skills presented on the course, assignments and tasks. Moreover, a key aspect in this research was investigating e-portfolio technology experiences including development and validation of its task.

The purpose of this study was to identify the process of developing an e-portfolio and examined its validity and coordinators' perceptions to assess learning performance in the High-Scope on-line game. The process of developing an on-line e-portfolio based contest was identified and illustrated in previous session. The e-portfolio system was also identified that the e-portfolio of each member or a team could provide well detail for evaluating purpose. There are three portions of e-portfolio. Those are personal information for introducing self to other members, on-line learning records, and team project.

The analyses of the participants' reflective narratives indicated a deeper understanding of students learning as well as the on-line course instruction. Overall, the development and use of the e-portfolio allowed learners to better understand the tasks submitted to their programs and increased their emerging technology application skills. Also it was evident, from this study, how participant learning has improved due to reflecting on it at the portfolio's stage. This study provided valuable results on this regard. However, more studies investigating different populations and factors relating to use of e-portfolios in the emerging technology learning are needed.

REFERENCES

[1] A. D. and H. D., "Data Visualization in Business Intelligence," in *Proceedings of the 11th WSEAS Int. Conf. on Mathematics and Computers in Business and Economics MCBE'10*, ed: WSEAS, 2011, pp. 164-167.

[2] L. M. Chen, L. H. Kuo, and H. J. Yang, "Applying Computerized Digitizing Technique to Explore the POP Album Cover Historical Reflections," *INTERNATIONAL JOURNAL OF COMMUNICATIONS*, vol. 6, pp. 109-119, 2012.

[3] L. H. Kuo, H. M. Wei, L. M. Chen, M. C. Wang, M. K. Ho, and H. J. Yang, "An Evaluation Model of Integrating Emerging Technology into Formal Curriculum," *INTERNATIONAL JOURNAL OF EDUCATION AND INFORMATION TECHNOLOGIES*, vol. 6, pp. 250-259, 2012.

[4] L. H. Kuo, H. M. Wei, W. C. Hu, and H. J. Yang, "Applying Innovation Theory in Observing Emerging Technology Acceptance," *International Journal of Systems Applications, Engineering & Development*, vol. 7, p. 56~65, 2013.

[5] L. H. Kuo, J. C. Yu, H. H. Yang, W. C. Hu, and H. J. Yang, "A Study of Creating Technology Education Course for Cloud Computing," *INTERNATIONAL JOURNAL OF Communications,*, vol. 6, pp. 98-108, 2012.

[6] L.-H. Kuo, H.-J. Yang, L. Lin, and H.-C. Lin, "Identifying a General Structure of Teachers' On-line In-service Learning," in *10th WSEAS International Conference on Edication and Educational Technology (EDU'11)*, Penang, Malaysia, 2011, pp. 87-92.

[7] L.-H. Kuo, H.-J. Yang, and Y.-W. L. Lin, "Overcoming the imbalance in the supply and demand of professionals in the marine industry: Professional development of marine education in Taiwan," *African Journal of Business Management*, vol. 6, p. 9202~9209, 2012.

[8] K. Bathgate, C. Harris, J. Comfort, and B. Oliver, "Challenges and Opportunities Implementing an ePortfolio Approach to Interprofessional Health Education in Australia," *Journal of Interprofessional Care*, vol. 27, pp. 160-161, Mar 2013.

[9] G. Cheng and J. L. N. Chau, "Exploring the relationship between students' self-regulated learning ability and their ePortfolio achievement," *Internet and Higher Education*, vol. 17, pp. 9-15, Apr 2013.

[10] B. M. Garrett, M. MacPhee, and C. Jackson, "Evaluation of an eportfolio for the assessment of clinical competence in a baccalaureate nursing program," *Nurse Education Today*, vol. 33, pp. 1207-1213, Oct 2013.

[11] H. M. Goodyear, T. Bindal, and D. Wall, "How useful are structured electronic Portfolio templates to encourage reflective practice?," *Medical Teacher*, vol. 35, pp. 71-73, 2013.

[12] J. A. Gordon and C. M. Campbell, "The role of ePortfolios in supporting continuing professional development in practice," *Medical Teacher*, vol. 35, pp. 287-294, 2013.

[13] P. Hall, A. Byszewski, S. Sutherland, and E. J. Stodel, "Developing a Sustainable Electronic Portfolio (ePortfolio) Program That Fosters Reflective Practice and Incorporates CanMEDS Competencies Into the Undergraduate Medical Curriculum," *Academic Medicine*, vol. 87, pp. 744-751, Jun 2012.

[14] A. King, "A trainee's guide to surviving ePortfolio," *Clinical Medicine*, vol. 13, pp. 367-369, Aug 2013.

[15] B. Oliver, "Graduate attributes as a focus for institution-wide curriculum renewal: innovations and challenges," *Higher Education Research & Development*, vol. 32, pp. 450-463, Jun 2013.

[16] O. H. D. and B. P.-D., "Business Intelligence and Information Systems:Enhancing Student Knowledge in Database Courses," *Review of Business Information Systems*, vol. 16, pp. 1-14, First Quarter 2012 2012.

Lung-Hsing Kuo received his Master (M.E.) in Education (1990~1993) and Ph.D. in Education from (1993~1997) National Kaohsiung Normal University. He is the director of the center for teacher career and professional development in National Kaohsiung Normal University. His research interests include social Science Research Methodology, Continuing Education, Human and social, Youth Study, Emotion development and management, Counseling and Education Issues.

Hsieh-Hua Yang received her Master (M.S.) in Health Promotion and Health Education from National Taiwan Normal University and Ph.D. in Health Policy and Management from National Taiwan University. She is a professor in Health Care Administration at Oriental Institute of Technology. Her research focuses are health behavior, social network and organizational behavior.

Wen-Chen Hu received a BE, an ME, an MS, and a PhD, all in Computer Science, from Tamkang University, Taiwan, the National Central University, Taiwan, the University of Iowa, Iowa City, and the University of Florida, Gainesville, in 1984, 1986, 1993, and 1998, respectively. He is currently an associate professor in the Department of Computer Science of the University of North Dakota, Grand Forks. He was an assistant professor in the Department of Computer Science and Software Engineering at the Auburn University, Alabama, for years. He is the Editor-in-Chief of the International Journal of Handheld Computing Research (IJHCR) and an associate editor of the Journal of Information Technology Research (JITR), and has acted as editors and editorial advisory/review board members for over 30 international

journals/books and served more than 30 tracks/sessions and program committees for international conferences. He has also won a couple of awards of best papers, best reviewers, and community services. Dr. Hu has been teaching more than 10 years at the US universities and over 10 different computer/IT-related courses, and advising more than 50 graduate students. He has published over 100 articles in refereed journals, conference proceedings, books, and encyclopedias, edited five books and proceedings, and solely authored a book entitled "*Internet-enabled handheld devices, computing, and programming: mobile commerce and personal data applications*." His current research interests include handheld/mobile/Smartphone/tablet computing, location-based services, Web-enabled information system such as search engines and Web mining, electronic and mobile commerce systems, and Web technologies. He is a member of the IEEE Computer Society and ACM (Association for Computing Machinery).

Hung-Jen Yang obtained a Master (M.S.) in Technology Education from University of North Dakota and a Ph.D. in Industrial Technology Education from Iowa State University. He is currently conducting research on knowledge transfer, and knowledge reuse via information technology. His research has appeared in a variety of journals including those published by the WSEAS.