

# **Designing and Development of EPSS (Electronic Performance Support System): Case of (CRMT) Course Resource Management Tool**

Sanghoon Park  
Chanhee Son  
Florida State University

## **Introduction**

Within the realm of the knowledge-based economy, technology is considered as one of the main force for the contemporary organizational developments. EPSS provides solution when there are specific needs for performing job task effectively. Generally, it provides help, demonstrations, advice, customized templates, access to database, or any other support that the performer needs to perform a task or series of tasks (Brown, 1996; Wager, 2002). EPSS does not only refer to individual performance support system but also encompass organizational performance support system. This is the reason why the EPSS should be tightly linked to the integral part of the task. Starting from this point of view, Course Resource Management Tool (CRMT) was designed and developed to support staff member's performance in managing course resource.

## **The design and development of Course Resource Management Tool (CRMT)**

The performance setting describes a learning resource center in college of education in southeastern area university. The resource center serves the staff and students in college of education. The functions of the department resource center include managing books, journals, CDs/CD ROMs, videotapes and teaching equipment. This resource center's staffing includes a supervisor and five graduate assistants (GA) to run the operation. The resource center has to meet the needs of approximately thirty teaching staff and two hundred students.

The resource center had problems monitoring the resources loaned out to students. The current system of loaning resources is still the traditional pen and paper recording. The center is also facing tedious work in the booking of teaching equipment. There is no system in managing the booking of equipment resulting in huge time consumption and plenty paperwork to be done by GA(Graduate Assistant)s. In order to minimize the unnecessary task process and maximize the performance of staff members, CRMT was designed and developed. The purposes of CRMT are (1) To monitor all resources and equipment using in an efficient and effective electronic system (Annual inventory check and loaning of equipment and resources), (2) To ensure all resources to be accountable by linking with the registrar. (3) To generate reports on the frequency of resources/equipment for future budgeting, planning and procurement, (4) To generate sign in / sign out forms for TA (Teaching Assistant)s. and (5) To monitor servicing schedule for all equipment. The work-flow analysis was broken into three phases for analysis, pre-semester, during semester and post-semester. Since GAs are main staff members of the center, the work flow was described based on the main tasks they have to carry out before the semester, during the semester, and after the semester. The Microsoft Access program was selected as a development tool. During development phase, input and output forms and reports were designed along with detailed database table structure. The formative evaluations were conducted separately with one week after the other. After the first evaluation, researcher did some changes before conducting the second evaluation. They were given the user's guide and the EPSS program, and they were told to open and run the database at their own time and pace without any intervention from us. All inputs (both verbal and non-verbal) were taken and changes were made on those deemed necessary, the amended inputs were consolidated and summarized in a table. Table 1 shows the suggestions made and their corresponding changes. Based on the suggested evaluation results, previous version has been revised and finalized. Finally, user manual and final development report were documented. The target level of this EPSS was work level. For group level, EPSS refers to the electronic system that provides integrated access to information, advice, learning experiences, and tools. The final object of group level of EPSS is to help someone perform a task with cooperation and support from other people. This presentation will provide detailed process of design and development of work level EPSS with tangible examples. Therefore, it will be a good case for the EPSS designer, especially who have been interested in designing work level EPSS.

## **Performance Opportunity**

Currently, the resource center has problems monitoring the resources loaned out to students. The current system of loaning resources is still the traditional pen and paper recording. The center is also facing

tedious work in the booking of teaching equipment. There is no system in managing the booking of equipment resulting in huge time consumption and plenty paperwork to be done by GAs.

### **Work-flow Analysis**

The new work-flow process is broken into three phases for analysis. The three phases are pre-semester, during semester and post-semester.

#### **Pre-semester phase**

GAs will receive course and students' information from registry office prior to the commencement of semester. The information includes courses that EPLS offers for that semester, details of courses' information and details of registered students' information. This new Microsoft Access program will require some system integration with existing registrar's database to obtain systems compatibility. The information obtained from registrar will update the new database. Before a new semester begins, GAs will send email to the teaching staff of EPLS to remind them to submit their resources and equipment requirement for their teaching needs for the new semester. The email will include attachment of resources and equipment request form and faculty authorization form. Upon the receipt of resource and equipment (books, journals, CDs, videotapes, and equipment) requests from teaching staff, GAs will do an inventory check and ensure all resources and equipment are available and proceed to update the database. GAs will generate a sign in / sign out file for all teaching assistants to check out the equipment. They will generate lists of existing resources and equipment for documentation purposes. In addition, GAs will generate an equipment schedule. This schedule will allow GAs, who are on duty to prepare the equipment for TAs.

#### **During semester phase**

The similar process mentioned earlier will also take place for ad-hoc and last minute request from teaching staff during the semester. The primary tasks that GAs are responsible are transaction of resources, and booking and signing in/out of equipment.

*Transaction of Resources* Students who are currently registered for courses can check in/check out required book, journals, CDs and videotapes. GAs will request student's ID to check if there is any outstanding fine. They will also check the availability of requested resources using the database. If resource is available and there is no outstanding fine, GAs will proceed to check in or out the resources required by students. GAs will print the receipt of the transaction for the student. The transaction is recorded in the database. When the resource is returned, GAs check in the resource and collect fine if there is any from the student. GAs will place the resources back to the bookshelf.

*Booking and Signing In/Out of Equipment* During the semester, ad-hoc requests for equipment are likely to occur. GAs will check available equipment before confirming the ad-hoc requests. GAs will prepare equipment for TA's collection on the required day and time. GAs will also ensure all items of equipment are accountable after TAs return the equipment; this includes proper handing and taking over of equipment through proper documentation.

#### **Post-semester phase**

GAs have the following responsibilities:

- Ensure all resources are checked in.
- For those overdue resources, GAs will contact the affected students and remind them to pay up by a specific date.
- GAs will send an email to registrar with a list of students who have not paid up their outstanding fines. Registrar will not allow students to register for class until they have paid up.
- Ensure all equipment are checked in and inform TAs who have not returned the equipment.
- Generate report of overdue payment for accounting purposes
- Save information into different file, for example Fall 2005
- Arrange for equipment to be sent for service and repair.

### **Inputs**

- Course Information:

Course Code, Course Title, Course Instructor, Course Day, Course Time, Course Room & Course TA

- Enrollment Information (from Registrar):  
Enrollment ID, Student ID & Course Code
- Equipment Information:  
Equipment ID, Equipment Type, Purchased Year, Estimated Shell-Life, Servicing Schedule, Servicing Company & Company Contact No
- Equipment Booking Information:  
Booking ID, Course Code, Equipment ID & Equipment Status
- Resource Information:  
Resource ID, Course Code, Resource Type, Resource Title, Resource Year, Resource Author, Resource Status & Resource Paid
- Student Information:  
Student ID, Student Name, Semester, Student Address, Student Major, Student Phone No. & Student Email.
- Transaction Information:  
Transaction ID, Resource ID, Student ID, Date Out, Date Due & Check in Date

## Outputs

The output (in the form of a report or form) should reflect the above information in addition to the following:

### Forms

- Check Out
- Check In
- Add/Edit Resource Information
- Add/Edit Course Information
- Booking of Equipment
- Edit Existing Bookings
- Add/Edit Equipment List
- Sign In/Out

### Reports

- Course Resource Report
- Overdue Resource Report
- Annual Resource List
- Overdue Payment Report
- Annual Equipment List
- Servicing Schedules

## Data Tables

The data tables include Course, Enrollment (From registrar), Equipment, Equipment Booking, Resource, Student and Transaction. The fields of each table are described below.

### Course table and its fields

Field	Data Type	Example	Notes
Course Code	Text	EME 6613	Primary Key
Course Title	Text	Electronic Performance Support System	
Course Instructor	Text	Walter Wager	
Course Day	Text	Thu	
Course Time	Text	12:30 – 15:15	
Course Room	Text	126	
Course TA	Text	Eileen	

Enrollment table and its fields

Field	Data Type	Example	Notes
Enrollment ID	Text		Primary Key
Student ID	Text		Foreign Key
Course Code	Text		Foreign Key

Equipment table and its fields

Field	Data Type	Example	Notes
Equipment ID	Text	DC0001	Primary Key
Equipment Type	Text	Digital Camera	
Purchased year	Date/Time	3/30/20001	
Estimated Shelf-Life	Text	5	
Servicing Schedule	Text	Once a year	
Servicing Company	Text	SONY	
Company Contact No	Text	8500001234	

Equipment Booking table and its fields

Field	Data Type	Example	Notes
Booking ID	AutoNumber	1	Primary Key
Course Code	Text	EDF 5400	Foreign Key
Equipment ID	Text	DC0001	Foreign Key
Equipment Status	Yes/No	<input checked="" type="checkbox"/>	

Resource table and its fields

Field	Data Type	Example	Notes
Resource ID	Text	BK0001	Primary Key
Course Code	Text	EME5601	Foreign Key
Resource Type	Text	Book	
Resource Title	Text	Introduction to Instructional Systems	
Resource Year	Text	1996	
Resource Author	Text	Kanazas & Rothwell	
Resource Status	Yes/No	<input checked="" type="checkbox"/>	
Resource Paid	Yes/No	<input type="checkbox"/>	

Student table and its fields

Field	Data Type	Example	Notes
Student ID	Text	9000	Primary Key
Student Name	Text	SangHoon Park	
Semester	Text	Fall 02	
Student Address	Text	2321 Continental Ave #120 Tallahassee FL 32304	
Student Major	Text	IS	
Student Phone No.	Text	8502222223	
Student Email	Text	Psh_fsu@hotmail.com	

Transaction table and its fields

Field	Data Type	Example	Notes
Transaction ID	Auto Number	1	Primary Key
Resource ID	Text	VI0001	Foreign Key
Student ID	Text	9010	Foreign Key
Date Out	Date/Time	10/27/2002	
Date Due	Date/Time	11/18/2002	
Check in Date	Date/Time	12/24/2002	

## Formative Evaluation

### Method

The formative product evaluation is the appraisal of instructional sequences and materials during their stage of formulation and development. The major purpose of formative product evaluation is to provide both descriptive and judgmental information regarding the worthiness of an instructional experience (Rothwell and Kazanas, 1992). In this paper, since the purpose of this tool was performance improvement, formative evaluation was conducted in terms of performance experience. Among the four major approaches of formative evaluation, individualized pretests and pilot tests were conducted. Two potential users from the learning resource center offered assistance to be involved in our formative evaluations.

### Result

The formative evaluations were conducted separately with one week after the other. After the first evaluation, researcher did some changes before conducting the second evaluation. They were given the user's guide and the EPSS program, and they were told to open and run the database at their own time and pace without any intervention from us. All inputs (both verbal and non-verbal) were taken and changes were made on those deemed necessary, the amended inputs were consolidated and summarized in a following table..

S/No	Suggestions	Changes
01	Program should be placed on desktop	Resource and equipment tool has been placed on desktop, on clicking the icon, the main switchboard will appear
02	In all edit/add functions, program should have a FIND button to search for desired items	Previously, our program has only some functions that have FIND button, after the change, most functions have FIND button
03	To add new record, users who have no knowledge on Microsoft Access do not know how to do it.	User guide has amended to include what to do, where to find the button and also a picture of the button to facilitate users' learning
04	Functions should be arranged accordingly to the frequent of use	The Check Out and Check In functions have been placed above Edit/Add Course and Resource Information
05	Users did not understand the significance of Yes and No in the status column in the Booking of Equipment function	A short message is placed beside the column explaining its significance. Amendments were also made to the user's guide
06	Users did not like the PK and FK on some of the field titles	All PK and FK were removed from the field titles
07	Title headings should be placed on several sub-forms, for example Booking of Equipment function	All title headings have been amended so that users know what they represent
08	Users suggested more prompt and short messages to remind the steps involved in a particular function	1. Steps have been included in Check Out function to assist users 2. Short messages have also been included in all functions to remind users what to do. For example, in the booking

		of equipment, a short message of “Click Update to check whether booking is confirmed” is added
09	Users suggested using pictures for equipment	Pictures are inserted for each equipment
10	Users suggested the layout to be more attractive, they found them too dull and boring	Proper formatting and variety of colors are added to the EPSS to make it more aesthetically appealing
11	Users suggested that for Check Out, it would be good to remind users to type in the necessary information	Different colors and font are used to distinguish the entry box to key in the data. A brief statement is used too

### References

- Brown, L. A. (1996). *Designing and Developing Electronic Performance Support Systems*. Boston: Digital Press.
- Wager, W. W. & McKay, J. (2002). EPSS: Visions and Viewpoints. In Reiser, R. & Dempsey, J. V. (Ed.), *Trends and Issues in Instructional Design and Technology* (pp 133-144). Upper Saddle River, NJ: Prentice Hall.
- Rothwell, W. J. & Kazanas, H. C. (1992). *Mastering the instructional design process. A systematic approach*. San Francisco: Jossey-Bass.