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INTELEK: An Interactive Learning Kiosk for Elementary Pupils

Joel B. Alvarez, MPA, MIT
Occidental Mindoro State College
College of Arts, Sciences, and Technology
San Jose, Occidental Mindoro, Philippines

Roselyn E. Sanqui
Occidental Mindoro State College
College of Arts, Sciences, and Technology
San Jose, Occidental Mindoro, Philippines

Marites D. Escultor
Occidental Mindoro State College
Information Technology Department
San Jose, Occidental Mindoro, Philippines

Jane Ann A. Danseco
Bubog 2 Elementary School
San Jose, Occidental Mindoro,
Philippines

Abstract:- The InteLeK: An Interactive Learning Kiosk for Elementary Pupils was designed and developed to provide an interactive and self-paced learning tool that can be used by the pupils. It contains different lessons suited in their grade level. The system was developed using Visual Basic for programming, Microsoft Access for database and Adobe Photoshop for the enhancement of the design and figures. ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model was used for the development of the system. It has the complete hardware equipment and measurement which suites to the prospective users of the kiosk system. The system was tried-out with a total of 35 respondents such as 5 IT experts, 10 elementary teachers and 20 Grade III pupils. The evaluators' assessment got a grand mean of 4.65 interpreted as "Excellent" which means that the developed learning kiosk system is enjoyable, educational and operationally functional.

Keywords:- *Learning Kiosk, elementary pupils, self-paced, ADDIE model.*

I. INTRODUCTION

Active learning is defined as any instructional style that engages students in the learning process, encourages them to evaluate what they are doing, and requires them to develop their own learning paths. [5] Active learning allows students to actively participate in the process rather than being passive listeners.

At its best, Computer Assisted Instruction (CAI) engages student interest, motivates them to learn, and increases their personal responsibility for learning. The most studies found out that the computer-based instruction has a positive effects on students[3]. Specifically, students learn more, learn faster (the average reduction in instructional time in 23 studies was 32%), like classes more when they receive computer help and develop more positive attitudes toward computers when they receive help from them in school.

The students of Information Technology department of Occidental Mindoro State College have produced CAI in their software development project. Some of these software projects are either installed in a computer or was utilized by the respective establishments or educational institution they have catered to. But most were just stored in the research room and was not even utilize as a learning tool. There were a total of 21 CAI programs available for use and 10 of these are for elementary lessons. A venue for computer utilization at the basic education department was provided by the College of Teacher Education. There were 50 computers at the CTE's Internet Hub, however these computers are used by college students and only an hour per week was allotted for each class needing computer applications in the elementary level.

The reading center for basic education pupils are provided by the college, however, stationary books and reading materials and no interactive tools were provided as a mode of learning, which results to few number of pupils staying at the reading center, except if it is required by the teacher.

A stand-alone computer can be use as a tool for learning. By installing useful learning applications that will let children to experience interactivity while learning would be a great supplementary tool in teaching the pupils. But due to the playful age of these pupils, the computer might be unintentionally damage or broken.

To cope up with this problem, the researchers created a customize kiosk in which the CAI applications were installed and will be made available for use among elementary pupils of OMSC. The kiosk will contain a complete set of computer which is specifically designed to safely hold each computer peripherals. This will be situated on a safe area duly assigned or designated by the school official, or in the reading center which was facilitated by a custodian. The study aimed to develop a system in which CAI applications for elementary pupils specifically for Grade III pupils will be compiled.

Through this system the students will experience interactive learning and the utilization of technology as a tool for learning will be maximized.

A. Conceptual Framework

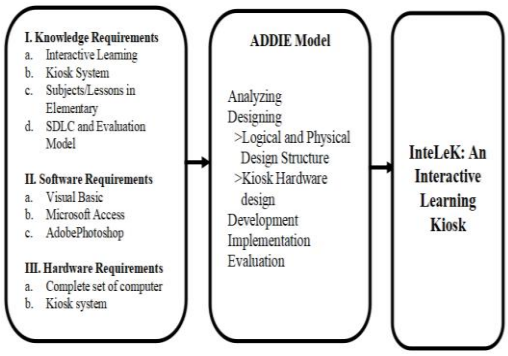

Fig. 1: Research Paradigm

The research paradigm shows the different elements necessary in the achievement of the objectives of the study.

The input stage consists of the knowledge requirements such as the general information about learning kiosk system, as well as the selected subjects and lessons and the evaluation model in developing the application. The process defines the step-by-step procedure that the researchers need to undertake during the conduct the stdy. The major steps identified based from the ADDIE model are (1) Analyzing, (2) Designing, (3) System Development, (4) Implementation and (5) Evaluation. The overall output of the process is the INTELEK: An Interactive Learning Kiosk.

B. Objectives of the Study

The study aimed to develop a kiosk that will handle the different CAI applications for Grade III elementary pupils of OMSC. Specifically, the study aimed to:

- Design a learning kiosk with the following features:
  - contains computer assisted instruction on different subjects of elementary;
  - provides an interactive contents;
  - support self-paced learning;
  - standardized contents and format;
  - has a friendly design and user interface, and
  - has a user guide.
- Create a system that will compile the available interactive learning applications; and
- Evaluate the performance of the developed learning kiosk system.

II. REVIEW OF RELATED LITERATURE

Effective training is possible when the competency, practiceoriented approach, active and interactive teaching methods are used [4]. With the help of the interactive methods, the students form the professional competences, develop analytical thinking, mobilize the cognitive powers, an interest in new knowledge is awakened, and the creativity of personality is revealed.

Interactive learning [2] as a sort of schoolwork or academic plan that uses computer technology in order to emphasize or teach specific material. Online classes and virtual classrooms are examples of extreme interactive learning, but almost any time a computer enters into the academic space as an educational game, for instance, or as a structure research tool, the resulting lessons can be said to be interactive.

The term interactive learning tool is commonly referred to a computer-based environment that integrates a group of learning modules such as audio, video, animations, simulations, graphics, text, etc. They enable students to experience their learning topic in an easy and expressive manner. Interactive learning systems have become a common practice in computer engineering education, and it received a considerable critical attention [5]. The interactive learning environment for teaching and learning contains a movie-like module, an animated hypertext introductory module.

An experimental study conducted [1] attested the effectiveness of using interactive learning technology in the teaching and learning environment and lead them to conclude that integrating interactive learning systems with traditional ones and harmoniously combining them may help improve the overall structure of the learning process and boost student progress.

An interactive kiosk is a computer station set up in a public space for public use [8]. It is used in different industries, establishment, offices or area, and the system itself uses different kinds of technology.

Finally, a kiosk computer is a terminal that provides interactive access to an institution's resources and allows for basic (or open) web browsing [7]. To create a "kiosk atmosphere" at school, you can place the computers where students congregate in informal situations outside of the classroom. The schools can set up kiosks in the office lobby, guidance, cafeteria, media center, foyer areas, and gym. These are places where students find themselves while not in the classroom. Students wants human interaction, other times they are looking for something less formal or even private. They might not want to walk into the social worker's office to make an appointment. Registering at a kiosk might be more their style.

III. METHODOLOGY

The study followed the procedure of system development covering the following:

A. Project Design

Project Design. The InteLeK System is a kiosk learning tool that can be used by students to provide lessons, activities, and interactive games to enhance their learning in enjoyable way. The hierarchical structure showing the contents and parts of the system is presented in Figure 2.

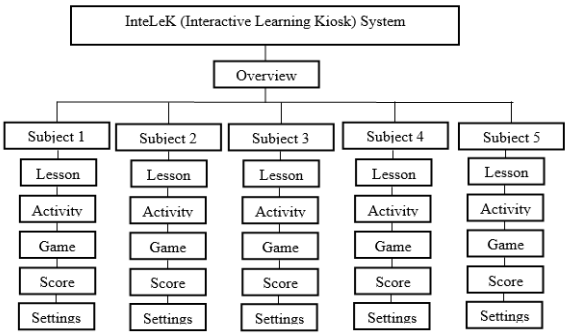

Fig. 2: Hierarchical diagram of Mobile Learning for InteLeK (Interactive Learning Kiosk)

The Figure 3 shows the hardware design and its components. The height of the kiosk is 4ft for exact eye level with the learners/users, the width is 20 inches for any standard LED monitor limiting to 50 cm to fit in. The top front is measured 18 inches for the placing of the glasses. The front extension for the keyboard and mouse measured with a height of 7.5 nches and width of 4 inches. At inside, it contains the speaker which is exactly fit inside the glass. The base is elevated by 3 inches for the placement of wheels for its mobility.

Fig. 3: Hardware design and its components

B. Project Development

The researchers initially formulate the logical and physical design structure of the learning kiosk. Determining the subjects to be included, various lessons for every subjects, the hierarchical design of the contents, and then choose the appropriate programming and multimedia tools including the hardware and software specifications.

The methodology for the learning kiosk design incorporated a set of stages which are summarized below:

- Phase 1: Content and Validation of Scope and Sequence. The scope and sequence of the learning kiosk will be formulated and shown to the technical experts in the given subjects and 10 IT experts for the structure and content validation of the kiosk design. In this phase, suggestions and recommendations among the experts will be the basis for the development of the system.
- Phase 2: Identification of a suitable application programs. Several application programs will be considered and identified during the planning stage of the project. Some of the programs were as follows: Macromedia Flash 8, Lectora Inspire, Adobe Photoshop, Camtasia Studio, QuickTime Player, Microsoft PowerPoint, and Microsoft Windows XP or higher version.
- Phase 3: Specifying Hardware Requirements. A Desktop with the following specifications: screen size/monitor size of at least 11", 1.8 GHz or faster processor, system memory of at least 2 Gigabytes of RAM, CD/DVD drives, Sound Card, Speakers, and Head set. It also includes the components in creating the kiosk physical components.
- Phase 4: Computer Assisted Learning Tool Specification. In this stage of development, the learning application is drawn up. This includes the description and structuring of the various options in the system. It also presents a series of activities or choices that allow the user to choose from the options available. The information was also organized in layers of increasingly detailed material so as to support flexible use.
- Phase 5: Computer assisted learning tool refinement. After the development stage, it will be initially tested by end users and evaluated to assess the instructional content, organization and design, mechanics, comprehensibility, functionality and maintainability. In particular, feedback from the preliminary testing will be used to highlight which aspects of the learning kiosk the users find most useful and whether there are any important steps or concepts to be included or omitted.
- Phase 6. Inclusion of user-defined features. Common adaptations, which were of wider value were incorporated into the core functionality of the learning kiosk.
- Phase 7. Final Testing. The final testing and evaluation was undertaken with the redefined learning kiosk, the same evaluation tool administered to test whether the respondents/evaluators were satisfied with the final refinements made on the computer learning kiosk.

The ADDIE Instructional System Design model used in developing the computer assisted learning application. It is a strategic planning and an organized design procedure that facilitates the creation and maintenace of the class.

The highlight of this learning tool is the lesson proper that entails operational procedure.

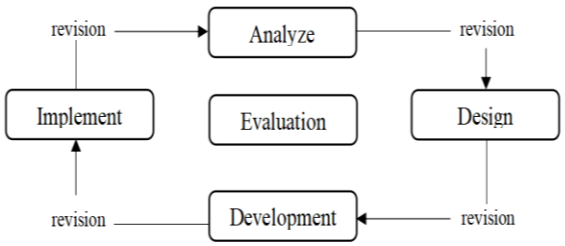

Fig. 4: The ADDIE model.

Figure 4 shows the five (5) different steps of development using the ADDIE model. The acronym "ADDIE" stands for Analyze, Design, Develop, Implement, and Evaluate. It is an Instructional Design model that has withstood the test of time and use. ADDIE is also known as the generic model which most other instructional design models are based on.

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The InteLek (Interactive Lesson Kiosk) system will undergo a series of modifications to attain the objectives and purpose in learning different subjects.

C. Operation Procedures

- Gather certain reference materials such as books, magazines and internet resources.
- Determine the overview of the different lessons.
- Formulate the objectives suited for the selected grade level.
- Discuss in detail information every lesson accompanied by graphics, animation, illustration and videos.
- Provide quizzes and different activities in the lesson.
- Show learning games in the application

D. Testing Procedures

The evaluation of the InteLek (Interactive Lesson Kiosk) system was conducted at Occidental Mindoro State College – Main Campus, San Jose, Occidental Mindoro consisting of 30 selected students from Grade III and 10 teachers teaching the various subjects presented in the system and 5 IT experts.

E. Evaluation Procedures

- Instructional content – measures the accuracy of information, consistency of content and context with the theme.
- Organization and design – measures the appropriateness and consistency of graphics and multimedia including the clear arrangement of all parts of the computer assisted learning tool.
- Mechanics – clarity in the presentation of the illustration and provides provision of means to sustain interest throughout the lesson.
- Comprehensibility – correctness of grammar and technical terms.
- Functionality – a useful function within a computer application or program.
- Maintainability – provision for diagnostic tool and procedures.

F. Statistical Treatment of Data

To determine the rating of each criterion of the InteLek (Interactive Lesson Kiosk) system that was developed, each criterion was rated in a scale of 1 to 5, 5 being the highest and 1 as the lowest; the weighted mean x is used to determine the level of the performance of the computer assisted learning tool. The formula is shown below:

- Formula for finding the weighted mean:

$$X = \frac{\sum fw}{n}$$

where: x- weighted mean
$\sum fw$ – summation of the product of frequency and weight
n – total number of respondents

- T-test – The independent sample t-test was used to determine the significant difference of evaluation ratings between the two groups of respondents on the performance of InteLek (Interactive Lesson Kiosk) system.

The 5-point Likert scale was used to determine the equivalent descriptive rating of the weighted mean.

IV. RESULTS AND DISCUSSIONS

This section presents the project description and structure, capabilities, limitations, and project evaluation.

A. Project Description

The system is compose of four (4) different CAI applications for Grade III pupils. It was installed in a kiosk with complete set of hardware for the system.

B. Project Structure

The actual kiosk used in the study and its features are shown int the screenshots below.

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Fig. 5: Screenshots of the developed system.

The set of images in Fig.5, are the screenshots of the Interactive Learning Kiosk. It has the main menu of the system. It displays 4 buttons of the CAI available for use. This is for the subjects Filipino, Science, Araling Panlipunan,

C. Project Evaluation

The performance of the system is evaluated in terms of Functionality, Reliability. Usability, Efficiency, Maintainability and Portability. There were a total of 35 respondents who evaluated the system compose of 5 IT experts, 10 elementary teachers, and 20 grade 3 students.

Criteria	Mean	Interpretation
Content	4.69	Excellent
Organization and Design	4.69	Excellent
Mechanics	4.65	Excellent
Comprehensibility	4.59	Excellent
Functionality	4.71	Excellent
Maintainability	4.58	Excellent
Grand Mean	**4.65**	**Excellent**

Table 1: Summary of Evaluation.

Legend: 4.51-5.50 – Excellent; 3.51-4.50 - Very Good; 2.51-3.50 – Good;
1.51-2.50 – Fair; 0.50-1.50– Poor

The result of evaluation regarding the maintainability of the system gained a mean of 4.58 which is equivalent to excellent in descriptive terms. This indicates that provisions for enhancements are available in the system.

V. CONCLUSIONS

In consideration of the objectives of the study and the results of testing and evaluation carried out, the following conclusions were derived:

The study aims to. Specifically, the study aims to:

- Developed a kiosk that handles the different CAI applications for elementary pupils of OMSC. A kiosk was successfully designed that:
  - It contains computer assisted instruction on different subjects of elementary;
  - It provides an interactive contents;
  - It support self-paced learning;
  - It has standardized contents and format;
  - It has a friendly design and user interface, and
  - It has a user guide.
- The system was created which compiled the available interactive learning applications; and
- The developed system was evaluated “Excellent” by the respondents which proves that the system performed according to the set objectives.

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